

**PROFESSIONAL AUDIO MIXING CONSOLE**

**PM2800M**

**OPERATING MANUAL**

**YAMAHA**

## HOW TO USE THIS MANUAL

If you are an engineer or technician who is familiar with sound system design, much of this manual will serve as a review for you. The basic features are presented in the "BRIEF OPERATING INSTRUCTIONS" section. Check this and the "SPECIFICATIONS" section, and you will see most of what you need to know. The balance of this manual provides background information for better utilization of the console and auxiliary equipment.

If you would like to know more about AC power distribution and safety, grounding, balanced versus unbalanced cables, direct boxes, and so forth, this information is also presented. Check the TABLE OF CONTENTS.

There are internal jumpers within the console which can be configured to change the functions and/or signal paths in certain circuits. Refer to the OPTIONAL FUNCTIONS section for details.

### TERMINOLOGY AND TYPOGRAPHIC CONVENTIONS

Generally, where we refer to a particular control or function as it is actually labeled on the console, we will use all upper case type. That is, if we refer to an input channel's gain control, we may print "the input GAIN control." On the other hand, if the feature is not labeled, we will use upper case type only on the first letter; for example, "observe there is no identification of the input Fader." If the front panel label is incomplete or ambiguous, we may augment it. For example, the aux return assign switches labeled "1, 2, 3, 4, 5, 6, 7, 8, ST" may be accompanied by the parenthetical reference "(aux ret assign)".

There are eight primary mixing busses (sometimes we simply refer to these as the 8 "mix busses," although there are other mix busses in the console, too). The faders controlling the output of the eight primary mixing busses are known as "Mix Bus Master Faders". The eight mix busses are different and distinct from the four "Auxiliary Mixing Busses" and the "Stereo Mixing Bus." The Stereo Fader has a pair of adjacent control knobs that can simultaneously adjust the left and right stereo bus output level as though it were a single fader, or the knobs may be offset to balance the relative output level on the left and right sides of the stereo bus. (As you can see, we generally refer to the stereo bus as a single bus, even though it is really a pair of busses — left and right.)

Apart from the eight primary mixing busses and the stereo bus, there are ten "Matrix Mixing Busses," each of which obtains signal from the correspondingly numbered primary bus or stereo bus if the associated

MIX TO MATRIX or ST TO MATRIX switch is engaged. These ten "Matrix Mixing Busses" appear in the "Matrix" control group of each MIX B module, where they can be mixed to drive one MATRIX OUT circuit; the four MIX B modules, therefore, produce four matrix outputs.

In addition to the previously described busses, there are 5 cue busses; three are for logic signals, allowing for priority of "input cue" signals over cue signals originating from other sources, and two are for the stereo cue signal itself (wherever it originates). There is also a solo logic bus.

Particularly important information is distinguished in this manual by the following notations:

**NOTE:** A NOTE provides key information to make procedures or functions clearer or easier.

**CAUTION:** A CAUTION indicates special procedures or guidelines that must be observed to avoid damage to the console or related equipment, or to avoid an undesirable result while using the console.

**WARNING:** A WARNING indicates special procedures or guidelines that must be observed to avoid injury to the operator or others using or exposed to the console or related equipment.

In the BRIEF OPERATING INSTRUCTIONS section of this manual, each feature is provided with a numerical reference. Elsewhere, if we are referring to that feature, we may cite the reference number in square brackets for clarity. For example, on the input module, the fifteenth control to be described is the ON switch. In other places on the console there are other ON switches. For clarity, then, if we are discussing this particular input ON switch, we will describe it like this: "the ON switch [15]".



**WARNING:** to reduce the risk of fire or electric shock, do not expose this equipment to rain or moisture.

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# SECTION 1

## INTRODUCTION

The PM2800M is Yamaha's first professional audio mixing console specifically designed for use in stage monitor mixing, although it has sufficient flexibility to be used in some general mixing applications, as well.

The console is available with 32 or 40 input channels. There are eight primary mixing busses to which any of the input channels can be assigned — not with simple on/off switches, as is common in standard mixing consoles — with continuous rotary “Mix Assign Controls” that allow each input to be mixed onto each of the mix busses. In addition to the rotary input mix assignment controls, there is an input fader which provides an opportunity for single-control overall adjustment of the level applied to any of the busses from that input channel. Concentric PRE/OFF/POST switches accompany each of the eight “Mix Assign Controls” and determine whether the control derives signal before the fader (PRE), after it (POST), or not at all (OFF).

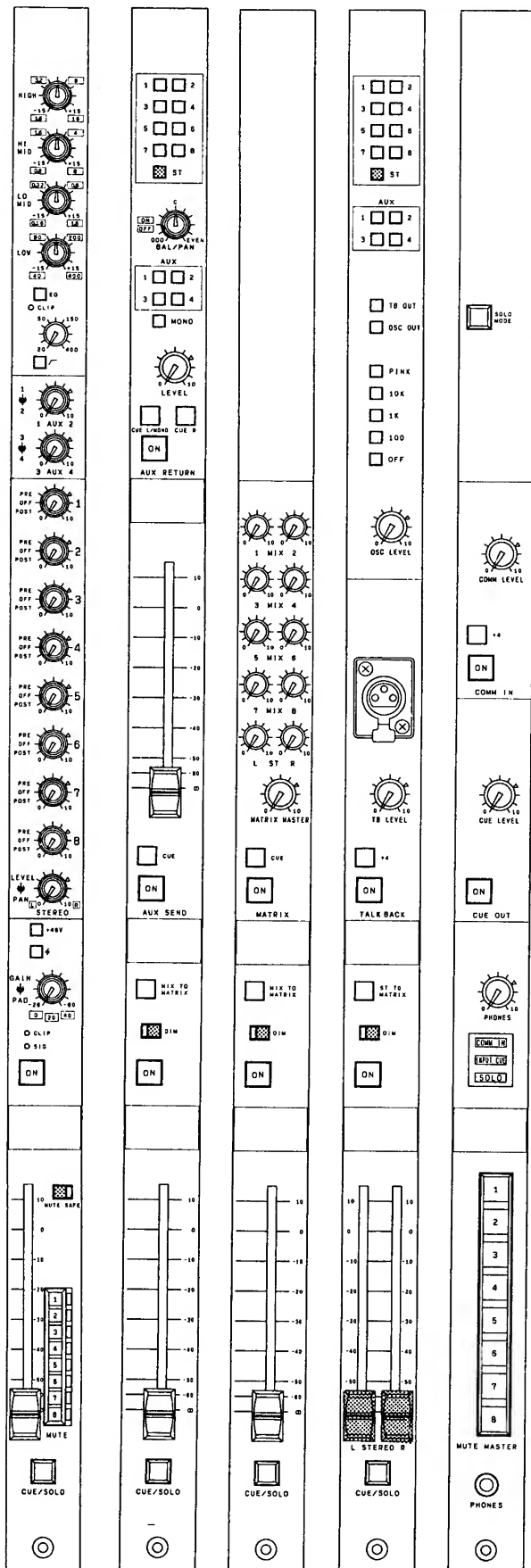
Four auxiliary send busses are provided. They may be used for echo, reverb, and other special effects and/or they may be used to augment the primary mixing busses; Pre/Post fader functionality may be altered by means of internal jumpers on the input channel circuit board. The stereo bus, too, is dual-purpose; it can be used to create a stereo mix, or it can be used to create two additional mono mixes. The four aux and two stereo busses, added to the eight primary busses, provides a total of 14 audio mixing busses — plenty for even highly complex stage monitor setups. Still need more mixes? The PM2800M has something that was pioneered by Yamaha — a mix matrix. Certain of the primary mixes busses can be used as “group” busses, then remixed in the matrix to feed additional feed discrete outputs, thereby further expanding the output mix capability of the PM2800M.

You may already know that the Mix Matrix is a feature which Yamaha pioneered in professional audio consoles. The PM2800M Mix Matrix is a 10x4 configuration. That is, there are 10 possible sources that can be mixed together into one output. Those 10 sources can be mixed together four different ways on the four Mix B modules. Each matrix channel accepts signals from the eight primary mixing busses and the stereo mixing bus (pre or post master fader, depending on internal jumpers). These ten sources all go through a MATRIX MASTER control and an ON/OFF switch to a discrete rear panel output.

The PM2800M inputs are differentially balanced, and are equipped with a three-position attenuation PAD plus a continuously variable GAIN trim control so that literally any mic or line level signal can be accommodated with channel faders set at nominal level. Optional IT1800 input transformers may be installed internally on a channel-by-channel basis when extra grounding isolation and high common mode voltage protection is required (i.e., when the console must be placed next to an SCR dimmer panel). While the console has ample headroom throughout, it is always possible to incorrectly set controls. For this reason, the PM2800M is equipped with level detection at several stages. “CLIP” LEDs are provided at the input preamp. Given that the signal is correct there, overboost in the EQ could still lead to clipping, so another LED, “EQ CLIP,” is included after the EQ section. Finally, if the mixed level on the stereo bus adds up to be too high, a “PEAK” LED in the output meters will flash on to warn of the impending danger of clipping.

The PM2800M has a MASTER MUTE function, as first introduced with the PM3000 and subsequently proved with the PM1800. Each input channel has eight MUTE assign switches. These permit the channel's ON/OFF function to be remotely controlled by the eight MASTER MUTE switches on the COMM module. Once a channel is switched on locally, it can be muted (turned off) or unmuted (turned on) if it is assigned to one or more of the mute groups. This permits multiple channels to be silenced or activated all at once, which expedites live sound mixing, band personnel or instrument changes, theatrical scene changes, and so forth. If, however, it is imperative that a certain channel never be inadvertently muted, or that muting temporarily be overridden, the input channel's MUTE SAFE switch can be engaged. Muting can also be controlled remotely, via a rear panel connector.

The PM2800M is equipped with four AUXiliary RETURN channels. Each of these is a stereo return, and can apply a stereo signal to any of the eight primary mixing busses (odd numbered = left, even numbered = right), or to the stereo mixing bus; a BAL/PAN control permits relative left/right level adjustments. Switches also allow aux return assignment to any of the four auxiliary send busses (for “looping” of one effect to the next, or for adding effects to an aux



bus which is used for other than effects purposes). A switch in each return also permits it to accept a mono signal and to apply that signal to any of the busses; in this case, the BAL/PAN control becomes a PAN control for odd/even or L/R bus assignment. Of course, if panning is not desired, the pot may be bypassed. The returns also include CUE and ON/OFF functions. In fact, they may be used as mono or stereo line inputs to the console when not needed for effects returns.

An excellent feature of the PM2800M is its extensive cue and solo capability. There is a CUE/SOLO switch on every input channel and on the aux returns, and a CUE switch on every auxiliary send, the primary mixing bus outputs, the matrix outputs and the stereo output. Cue replaces the signal in the headphones and the stereo cue XLB outputs with only those sources whose CUE switches are engaged. Furthermore, there is input cue priority, so that the operator may normally monitor the cue signal from the stereo bus or the primary mix busses, and can instantly check one or more channel or aux return inputs without having to first release the bus CUE switches. This capability is great for troubleshooting, previewing a channel before applying it to the mix, or "touching up" the EQ on a channel during a performance. For use ahead of a live show, the console may be placed in solo mode. In this mode, only the input channel(s) whose CUE/SOLO switch is engaged will feed the console's outputs, and all other input channels will be muted; returns will not be muted so that any effects applicable to the input will be heard. Similarly, if an aux return Cue/solo switch (labeled CUE) is engaged, only the aux returns will be heard, and all input channels will be muted (unless their CUE/SOLO switches are engaged). The SOLO switch and LED flash to signal the operator that the console is in solo mode; in addition, the SOLO annunciator flashes or the CUE annunciator lights up (depending on whether SOLO mode is selected) whenever any CUE or CUE/SOLO switch is engaged.

**Figure 1-1. PM2800M Modules.**

**Left-to-Right:**

**Input (32 or 40 in console)**

**Mix A (4 in console)**

**Mix B (4 in console)**

**Stereo/Talkback (1 in console)**

**Comm (1 in console)**

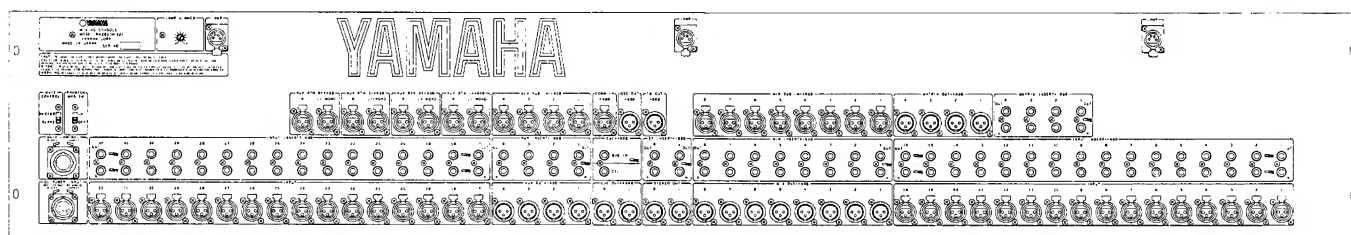
There is extensive talkback and communications capability in the PM2800M, plus a useful test oscillator. An XLB input can be set to accept any microphone or line level input, and is activated with the TALKBACK switch. That signal can be slated to any of the eight group mixing busses, the six aux send mixing busses, the stereo mixing bus, and to a rear panel XLB TB output. The test oscillator can be set to 100 Hz, 1 kHz or 10 kHz, or pink noise, and its output level is adjustable. The oscillator can be slated to the same busses as the talkback, and also has its own rear panel output connector so the signal can be routed to other equipment or other console inputs for testing. Accompanying the talkback and oscillator functions is a communications input. That input will accept any mic or line level audio signal, typically from a professional intercom system, another console's talkback output, or a stage manager's mic. When a signal is present, a front panel COMM IN light flashes to signal the operator, who can then turn on the communications input (if desired), so the signal appears on the console headphone and cue outputs. Thus, with COMM IN and TALKBACK, the console operator can establish 2-way communications without having to wear an intercom headset as well as cue headphones.

Comprehensive metering is provided with a total of 16 VU meters (Stereo meters include peak LEDs). The meters on include switching to monitor 22 different circuits.

PM2800M's electronic performance is excellent. Its stable input preamplifiers, low noise integrated circuits, and sophisticated design make your job easier. In fact, low noise, wide headroom throughout, exceptionally low distortion, and quiet controls are the hallmark of this top quality mixing console.

A special chassis and the widespread use of structural aluminum allows us to build a lighter chassis without sacrificing any strength. A modern-looking gray finish and subtly color coded controls set the backdrop for the PM2800M's hundreds of switches and indicators. All illumination (except VU meters and detachable hooded lamps) is by means of light emitting diodes, so maintenance is greatly reduced.

The sophisticated PM2800M, with its many internally jumpered functions, provides many of the features of custom consoles while retaining all the value and reliability of a Yamaha professional console. While its numerous internal and front panel functions may at first intimidate the casual console operator, the PM2800M is actually a very straightforward console to use. Anyone who has used the PM1800 or PM3000 will instantly know how this board works. In fact, if you've ever used a Yamaha M916, M1516 or M1532 console, you will immediately feel comfortable with the PM2800M. Take a while to study the panel, read the descriptions in this manual, and you'll find operating this console comes as naturally as any you've encountered. And it's far more flexible than most.



**Figure 1-2. PM2800M-32 Rear Panel**



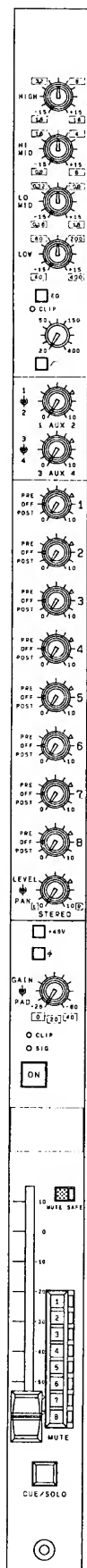


## SECTION 2

# BRIEF OPERATING INSTRUCTIONS

### 2.1 PM2800M Front Panel Features

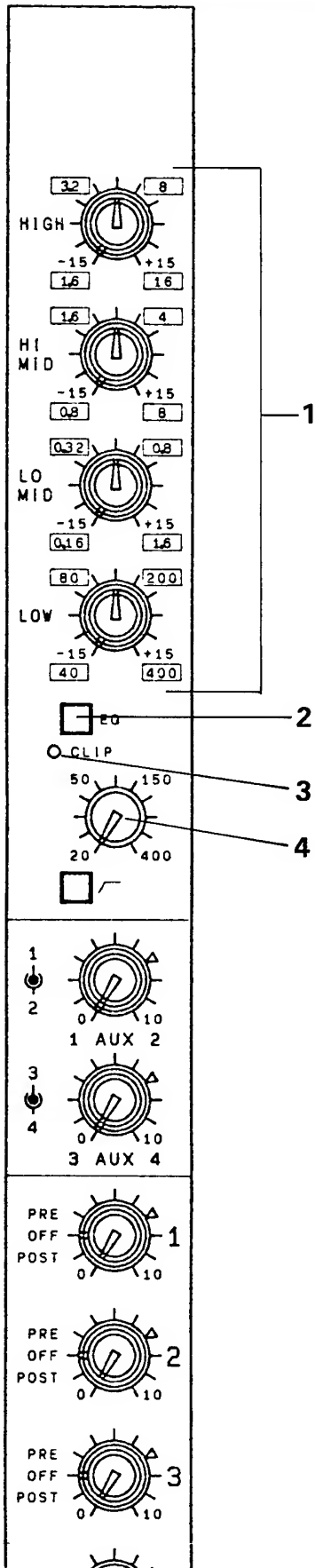
*NOTE: In the caption of each module illustration, we have included the Yamaha module part number in parentheses.*



[PM2800M Input module details on subsequent pages]

**Figure 2-1. PM2800M Input Module (IP2800)**

## 2.1.1 The Input Module



### 1. EQUALIZER:

The input channel equalizer is divided into four bands, each with sweepable filter frequencies. The high and low bands have shelving EQ curves, whereas the high-mid and low-mid bands have peaking curves. The level (gain) is adjustable over a range of 15 dB boost and 15 dB cut in each band.

#### +15 - -15 dB

The inner concentric knob adjusts the Gain of the set frequency band by plus or minus 15 dB. A center detent is provided for unity gain. This knob has the same function in each of the four EQ bands.

#### HIGH

The outer concentric knob sweeps the EQ Frequency between 1,600 and 16,000 Hz.

#### HIGH-MID

The outer concentric knob sweeps the EQ Frequency between 800 and 8,000 Hz.

#### LOW-MID

The outer concentric knob sweeps the EQ Frequency between 160 and 1,600 Hz.

#### LOW

The outer concentric knob sweeps the EQ Frequency between 40 and 400 Hz.

### 2. EQ (In/Out switch)

This locking switch activates the channel EQ (switch in) or bypasses it completely. Bypass allows for A-B comparison, and absolutely minimum signal degradation when EQ is not needed.

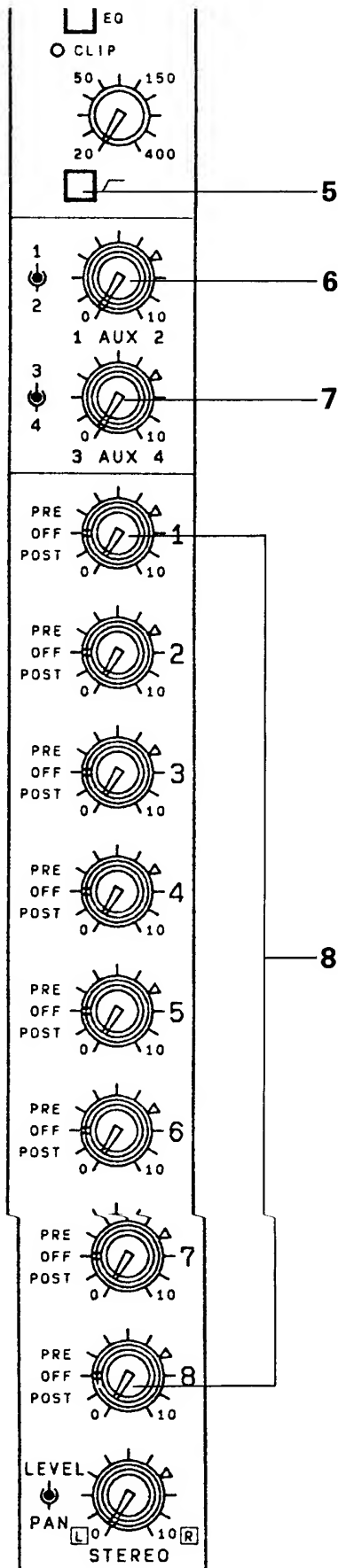
### 3. EQ CLIP

This red LED turns on when the post-EQ signal is 3 dB below clipping, warning to decrease the EQ boost and/or to turn down the signal level at the channel input gain stage. Clipping at this stage can occur even though the input signal is not clipping, due to boost (gain) applied with the EQ circuitry.

### 4. 20 - 400 Hz (H.P. filter)

This rotary control sweeps the cutoff frequency of a high pass filter (low cut) from 20 Hz to 400 Hz. The filter slope is 12 dB/octave.

Typical applications including cutting wind noise, vocal "P" pops, stage rumble, and low frequency leakage from adja-



cent instruments.. Higher frequency settings can be used to reduce leakage into mics that are primarily handling high-frequency sources. In general, it is a good practice to use the filter to protect woofers from unnecessary over-excitation due to the presence of unneeded low frequency or subsonic components, especially if a microphone is dropped or kicked; the filter should be bypassed (switch up) only when low frequencies are intentionally sought, as with a synthesizer, drum, bass guitar, and so forth.

##### 5. (H.P. filter In/Out switch)

This locking switch activates the input channel HIGH PASS FILTER (switch in) or bypasses it. This filter bypass function is independent of the EQ section, which has its own bypass switch.

##### 6. AUX 1, AUX 2 (Send Level)

This pair of concentric, rotary AUX send level controls determines how much of the selected signal source is applied to the correspondingly numbered auxiliary mixing bus. As shipped, these sends derive signal after (POST) the channel Fader, EQ and HPF. Internal jumpers in the module, however, can be rewired so the signal is derived before (PRE) all three items, or before (PRE) Fader, but after the EQ and HPF. The associated rotary control. (See Note below the AUX 3/4 description.)

##### 7. AUX 3/4 (Send Level)

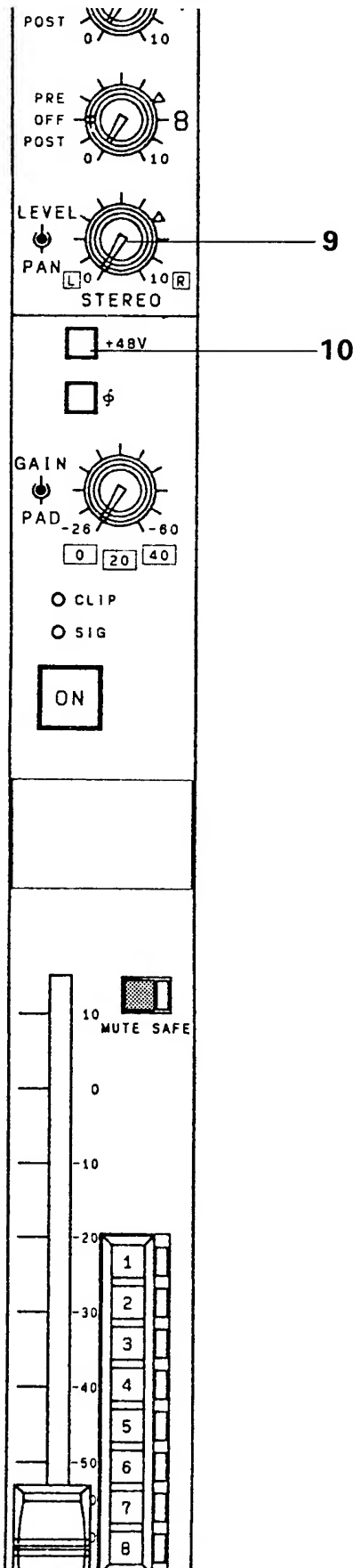
These two concentric controls are identical to AUX 1 and AUX 2, but affect signal applied to the AUX 3 and AUX 4 mixing busses.

*NOTE: An individual jumper is provided for each AUX send to determine whether the send will be pre or post Fader (factory shipped configuration is post Fader). Moving this jumper changes the corresponding AUX send so it is derived pre-Fader and pre-EQ. In some applications, it is preferable to have the PRE mode be Pre-Fader but Post-EQ rather than Pre-Fader & EQ. The PM2800M is equipped a single internal jumper on each channel that makes it easy to change the "Pre" of all four of the channel's AUX sends in this manner. These functional modifications can be performed on a channel-by-channel basis. Refer to OPTIONAL FUNCTIONS in Section 6 for more information.*

##### 8. 1, 2, 3, 4, 5, 6, 7, 8 (Mix Assign Controls)

Each of these eight rotary controls may be used to assign signal from the input channel to the correspondingly numbered primary mixing bus. A concentric 3-position switch determines whether the signal from the channel will be derived ahead of the channel Fader (PRE), after the Fader (POST) or not at all so that the channel will not be applied to the particular bus (OFF).

(See Note on next page)



*NOTE: PRE position is factory set so that signal is derived not only ahead of the Fader, but also ahead of the high pass filter and equalizer; a single jumper may be moved within the module so that the PRE function (for all eight of these controls) derives signal after the HPF and EQ, but still before the Fader. Refer to the OPTIONAL FUNCTIONS section of this manual for additional information.*

## 9. STEREO (Level & Pan)

This pair of concentric, rotary controls set the channel's output level to the stereo bus, and enables that output to be assigned to any position from full left (full counterclockwise rotation) to full right (full clockwise rotation). The inner knob determines the overall output level to the stereo bus, while the outer knob sets the pan position; a center detent is provided for equal signal assignment to the left and right sides of the stereo bus. Center position does apply 3 dB less signal to each bus than the level obtained with full left or right assignment so that the combined stereo signal adds up to constant power at all PAN pot positions.

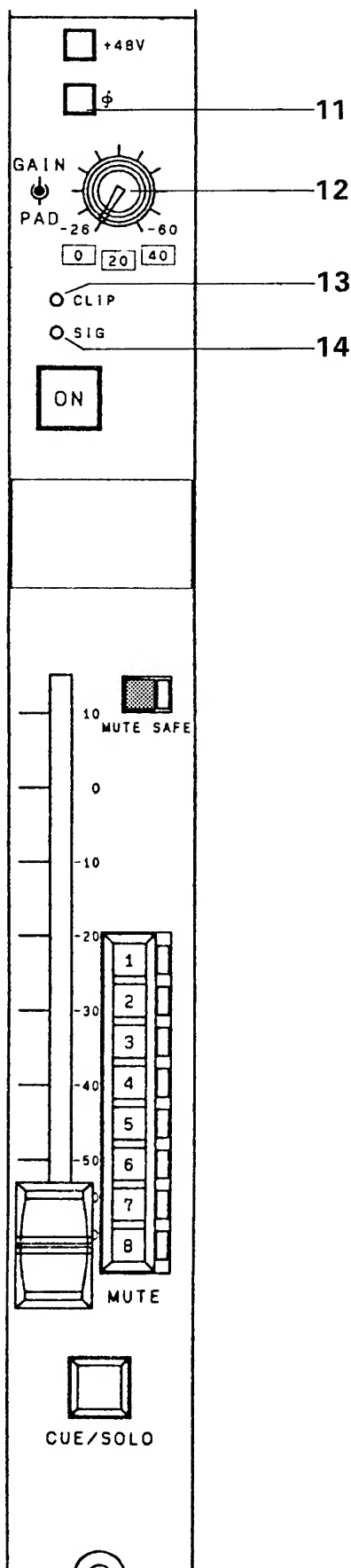
*NOTE: The STEREO send is factory set so that the signal is derived after (POST) the Fader, EQ and HPF. A jumper may be moved within the module so that the STEREO send comes before (PRE) the Fader, EQ and HPF. A second jumper may be set to alter this PRE function to be before the fader but after the EQ and HPF; this second jumper, however, will also affect any Aux and Mix Bus assigns which are derived Pre-Fader. Refer to the OPTIONAL FUNCTIONS section of this manual for additional information.*

## 10. +48V

This switch turns phantom power on and off at the channel's XLB input connector. Power can be turned on only if the MASTER PHANTOM POWER switch is on.

When both the Master and this switch are on, +48 volts is applied to both pins 2 & 3 of the channel input XLB connector, via 6.8 kohm isolation/current limiting resistors, for remote powering of condenser microphones. Although phantom power will not harm most dynamic and other non-phantom powered microphones or line-level devices, connection of an unbalanced source to the channel input could partially short the console's phantom supply, cause undue loading and induced hum. Therefore, it is a good practice to turn off the channel's phantom power unless it is actually in use.

*NOTE: The console's microphone power supply is not intended for A-B powered microphones. External supplies may be used with these devices, in which case the console's phantom power should be turned OFF on the appropriate channels. The optional input transformers, if installed, do not affect phantom power operation.*



### 11. Ø (Phase)

This switch reverses the polarity of pins 2 and 3 of the channel's XLB input connector. When this switch is up, pin 2 is the signal high conductor, and when the switch is engaged, pin 3 is high. This eliminates the need to rewire connectors or use adapters for out-of-phase (reversed polarity) audio sources. Sometimes intentional polarity reversal can be helpful in canceling leakage from adjacent microphones; this is often useful in avoiding feedback on stage. Additionally, the phase reversal can be used to create electro-acoustic special effects by mixing together out-of-phase signals from mics picking up the same sound source.

### 12. GAIN and PAD (0, 20, 40)

The inner concentric GAIN knob provides 34 dB of continuously variable adjustment for the input preamplifier gain.

The outer concentric knob is a 3-position rotary switch that attenuates ("pads") the signal from the channel's XLB input by 0, 20, or 40 dB. A setting of "40" is therefore least sensitive. The PAD should be used in conjunction with the GAIN control to obtain the precise channel sensitivity necessary for a given source. It is always a good idea to begin with the PAD set to 40 dB position, and to back off from there to avoid any chance of input overdrive.

*NOTE: The PAD and GAIN settings affect only the XLB input, not the INSERT IN jack.*

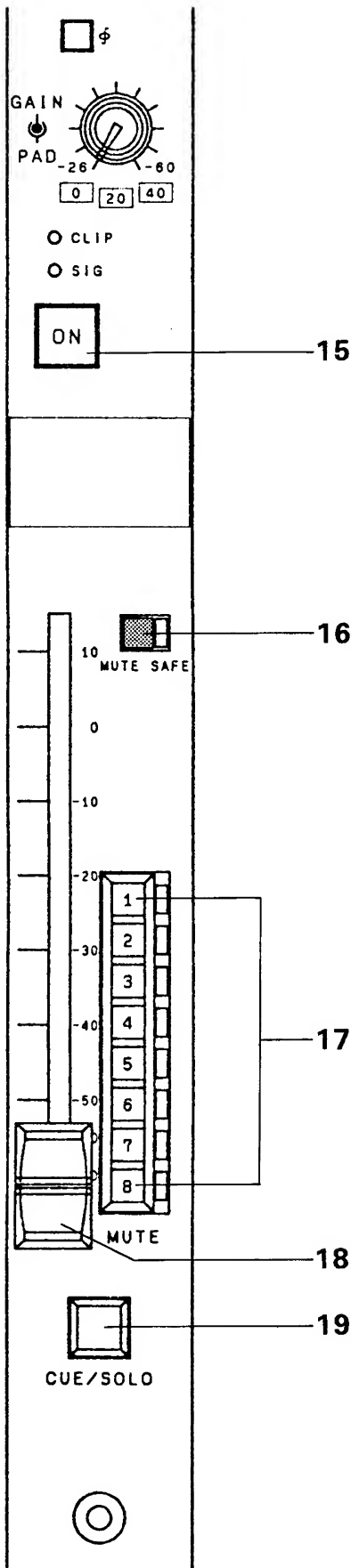
### 13. CLIP

This red LED indicates when the signal present after the channel preamp (either from the XLB or from the INSERT IN jack) is too high in level. The CLIP LED turns on when that signal is 3 dB below clipping, and should therefore flash on only occasionally. If necessary, use a higher PAD value or decrease the GAIN setting to prevent the LED from remaining on any longer than momentarily; otherwise excessive distortion and insufficient fader travel will result.

*NOTE: The PAD and GAIN settings will have no effect if the channel input is derived from the INSERT IN jack rather than the XLB; if an INSERT IN source is too high in level, try adjusting the output level of the source, or use an external attenuation pad.*

### 14. SIG (Signal Present)

This green LED indicates when signal is present after the channel preamp (either from the XLB or from the INSERT IN jack). SIGNAL is illuminated when the signal is 10 dB below the nominal level, and should therefore be on most of the time when the channel is in use. If necessary, use a lower PAD value or increase the GAIN setting to ensure the SIGNAL LED is ON most of the time; otherwise excess noise or a very small useable range of fader travel will become a problem. (As stated above, PAD & GAIN settings



do not affect the INSERT IN, so turn up the output level of any source device feeding that input, if applicable.)

#### 15. ON (Channel On)

This locking, yellow, illuminated switch turns on when the input channel is ON, indicating the channel output is available to the 8 primary mixing busses, the stereo bus and the 4 auxiliary mixing busses. Engaging the switch does not necessarily mean the switch will be illuminated or that the channel will turn on; muting logic may be dictating that the channel remain off. When the channel is OFF, its signal may still be previewed with the CUE/SOLO switch [19].

#### 16. MUTE SAFE

When this locking switch is engaged, and adjacent yellow LED is illuminated, it overrides any combination of MASTER MUTE and channel MUTE switch settings, and prevents the channel from being muted. Engaging this switch ensures the channel will always be on so long as the channel ON switch is also engaged.

#### 17. MUTE (Assign 1 - 8)

Engaging any of these 8 locking switches enables the corresponding Group MUTE MASTER switch(es) to "kill" this channel. An exception exists when the channel MUTE SAFE switch [16] is engaged, in which case these MUTE switches can have no effect. When a MUTE switch is engaged, the adjacent yellow LED turns on.

#### 18. FADER

This smooth, long-throw fader sets the level applied to the eight primary mixing bus assign controls if they are set to POST mode. It also affects the auxiliary and stereo sends in the channel (unless they are jumpered to derive signal pre-fader).

#### 19. CUE/SOLO

The function of this switch on each input channel will depend on the setting of the console's Master SOLO MODE switch [58], as indicated by the Annunciator Light panel [70].

If the console is set to the SOLO mode, then pressing this switch mutes all other input channels, and only the input channel(s) whose CUE/SOLO switch is engaged will feed the console outputs. Any AUX RETURN signals will not be muted so that effects can be heard in conjunction with the input signal. To silence the AUX RETURNS, turn them off manually.

If the console is set to the INPUT CUE mode, it then has a dual-priority cue system, designed to give the engineer maximum control and speed when it is most important. In this mode, pressing the input channel CUE/SOLO switch

The engineer can readily select any of 17 output mixes (Mix 1-8, Matrix 1-4, Aux Send 1-4, or Stereo L/R) by pressing the corresponding CUE switches. In most cases, once the individual output mixes have been established, the engineer will want to listen to the "most important output mix" during the performance, possibly the lead vocal monitor mix. However, should feedback occur, or should any other condition require attention, the PM2800M enables the engineer to instantly check any input channel or channels by pressing the corresponding CUE/SOLO switch(es). The input whose CUE switch is engaged then automatically replaces the selected output mix in the headphone and cue outputs. The engineer can make the necessary adjustment, and then return to monitoring the original output mix simply by releasing the input CUE/SOLO switch.

Pressing the yellow illuminated CUE/SOLO switch part-way down causes momentary contact; pressing it further locks it down. Although the cue signal is not affected by the Fader or ON/OFF switch, it is affected by the Input PAD, GAIN control, and anything connected between the channel's INSERT IN and OUT jacks.

**NOTE:** Since the console operator may normally be listening to the stereo bus or one or more primary mix busses by means of engaging their cue switches, the PM2800M is set up for input cue priority. As soon as one or more input channel cue switches are engaged, any bus cue signal will be replaced by the input cue signal(s). Input priority is also given to other PM2800M inputs (Aux Return cue), not just to the input channel cue signals.

The upper halves of MIX A modules 1 through 4 include the controls for the AUX RETURN inputs 1 through 4. Just below are the controls for AUX SEND outputs 1 through 4. Finally, toward the bottoms of these modules, are located the Master Faders for Mix Busses 1 through 4, as well as associated Bus ON, dim, and other controls. These four modules are similar, differing only in the actual mix bus, aux send and aux return numbers.

The following descriptions of one of these modules is typical of all four (MIX A-1 through MIX A-4). Bear in mind that each rear-panel Auxiliary Return input actually consists of two input connectors, L/MONO and R. When a mono signal is applied to an Aux Return, the "L/MONO" input should be used.

Page 2-7



## AUX SECTION

**20. 1 2 3 4 5 6 7 8 (Mix Bus Assign)**

These locking switches assign the AUX RTN signal to primary mixing busses 1 through 8.

**21. ST (Stereo Bus Assign)**

This locking switch assigns the AUX RTN signal to the STereo bus; the relative level applied to the left and right sides of the bus is determined by the BAL/PAN pot [25].

**22. BAL/PAN (Pot) and ON/OFF (Switch)**

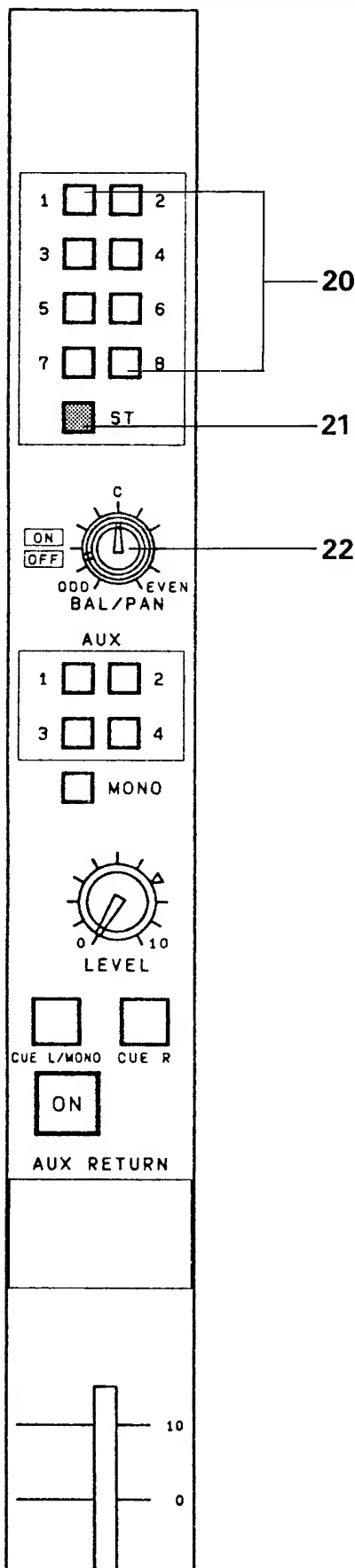
A 2-position rotary switch is mounted concentrically with the BAL/PAN pot. When the switch (outer knob) is ON, the BAL/PAN pot (inner knob) affects signal which is routed to any assigned odd-numbered primary mixing busses (counterclockwise rotation) and even-numbered busses (clockwise rotation), as well as to the stereo mixing bus. When the switch is OFF, the pot affects only the mixing bus; signal assigned to any of the eight primary mixing busses goes directly to those busses, bypassing the PAN function.

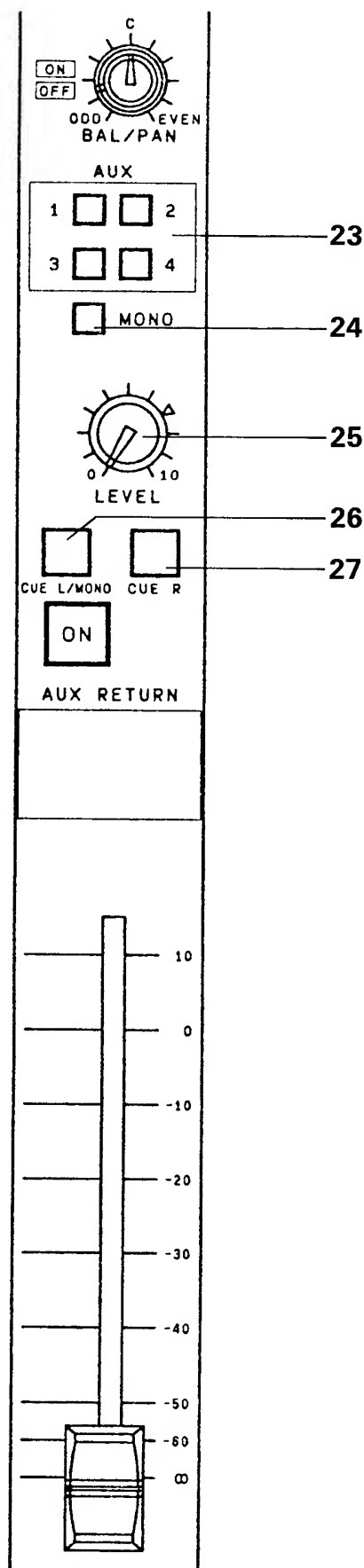
This reason that this control is labeled "BAL/PAN" is that it enables a mono auxiliary return to be panned, or a stereo return to be balanced in level. Given a mono auxiliary return (using the L/MONO AUX RTN input), BAL/PAN acts as a PAN pot and can position the return signal between any odd-numbered and even-numbered mixing busses, as well as between the left and right sides of the stereo bus.

Given a stereo auxiliary return signal, the BAL/PAN control instead functions as a BALANCE control. In this instance, the L input is routed entirely to the odd-numbered mixing busses (and the left side of the stereo bus), and the R input goes to the even-numbered mixing busses (and the right side of the stereo bus), per any engaged assign switches above the control. The BAL/PAN control then raises the level to one side while lowering it to the other, and vice versa.

A center detent is provided for equal PAN signal assignment to odd/even (or L/R); when panning a mono input, center position does apply 3 dB less signal to each bus than the level obtained with full left or right assignment so that the combined stereo signal adds up to constant power at all PAN pot positions. With a stereo input, centering the BAL/PAN control applies maximum available level (after the Aux Return LEVEL control [25] to the assigned busses.

*NOTE: An aux return signal applied to an aux send bus is always mono, whether derived from a mono or stereo return.*





### 23. AUX 1 - 4 (Assign)

These 4 locking switches assign the aux return signal directly to the correspondingly numbered auxiliary mixing busses. If the return is stereo, it will be combined to mono so that both sides of the return are applied to any of the assigned aux busses.

**CAUTION: DO NOT assign a return to the same auxiliary bus whose output is feeding a signal processor which is providing the return signal. This will almost certainly cause feedback which can damage circuits and/or loudspeakers.**

### 24. MONO

Pressing this locking switch activates L/MONO aux input as the sole signal input to this AUX section. *Do not engage this switch for stereo aux returns.*

### 25. LEVEL

This rotary control sets incoming AUX level applied to any of the assigned primary or auxiliary mixing busses. It is a 2-ganged control, simultaneously adjusting the L/MONO and R aux returns.

### 26. CUE L/MONO

Pressing this switch part-way down causes momentary contact; pressing it further locks it down. The Cue signal will be MONO (equal in both left and right sides of the cue output) if only this switch is engaged. See the description of the CUE R switch below for a further explanation of this function.

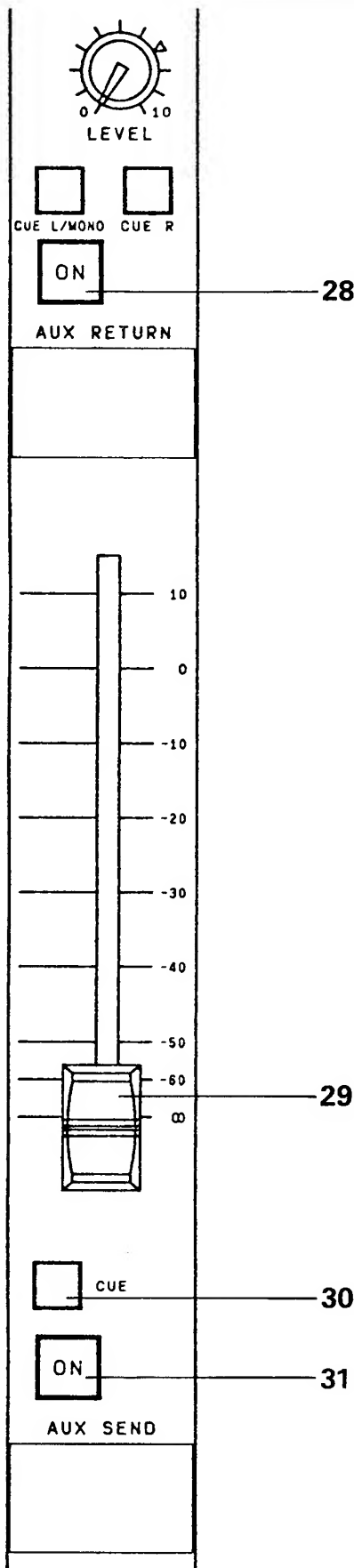
### 27. CUE R

Pressing this switch applies Cue signal to the Right side of the cue and Phones outputs if there is a stereo aux input.

When the console is in cue mode (refer to SOLO MODE switch [58]), and this CUE R switch (and/or the CUE L/MONO switch) is engaged, the aux return signal replaces any master signal in the corresponding side of the Cue output and the Phones output. Aux Return Cue signals are mono regardless of whether the input is mono or stereo.

**NOTE:** As noted under the input channel cue switch description, the PM2800M exhibits input cue priority logic. Since AUX IN is an input, it too receives priority. This means that either aux return cue (L/MONO or R), when selected, will replace any other group or stereo bus cue signals.

When the console is in solo mode (again, refer to SOLO MODE switch [58]), the aux CUE switches function similarly, but not the same as, the input channel CUE/SOLO switches. Engaging either aux CUE switch will mute all input channels (unless their CUE/SOLO switches are engaged), but will not mute the other aux returns; to mute other returns, disengaged their ON/OFF switches.



## 28. ON (Aux Return On)

This locking, yellow, illuminated switch turns ON when the aux return is ON, indicating the aux return signal is available to the 8 primary mixing busses, the stereo bus, and the 4 auxiliary mixing busses. When the return is OFF, its signal may still be previewed with the adjacent CUE switches [26 or 27].

## 29. Fader (Aux Send)

This linear fader adjusts the level from the auxiliary mixing bus having the same number as the MIX A module (i.e., 1 through 4) to the AUX OUT XLR connector. If the aux bus is utilized as though it were a primary mixing bus, then this fader serves as a master output fader for the mix.

## 30. CUE (Aux Send Cue)

Pressing this yellow illuminated switch part-way down causes momentary contact; pressing it further locks it down. When the CUE switch is illuminated, the correspondingly numbered auxiliary send replaces any master cue signal in the Cue output and the Phones output unless an input CUE switch is engaged. (Bus cue signals are overridden by input cue.) The aux cue signal is mono, regardless of how many aux sends are cue'd.

## 31. ON (Auxiliary On)

This locking, yellow, illuminated switch turns on when the AUX OUT is ON. When the AUX OUT is turned off, its signal may still be previewed with the adjacent CUE switch [30].

## OUTPUT SECTION

### 32. MIX-TO-MATRIX

Engaging this locking switch assigns signal from the module's MIX OUT (ahead of the Mix ON switch) to the correspondingly numbered matrix bus (which drives the rotary MIX controls on the MIX B modules).

*NOTE: The signal is assigned to the matrix by a jumper within each of the MIX A and MIX B modules. As shipped, the mix bus feed to the matrix comes after the Mix Master Fader; a jumper may be moved within each Mix A and MIX B module to obtain a pre-Mix Master Fader feed to the matrix. Refer to the OPTIONAL FUNCTIONS section of this manual for more information on this optional jumper function.*

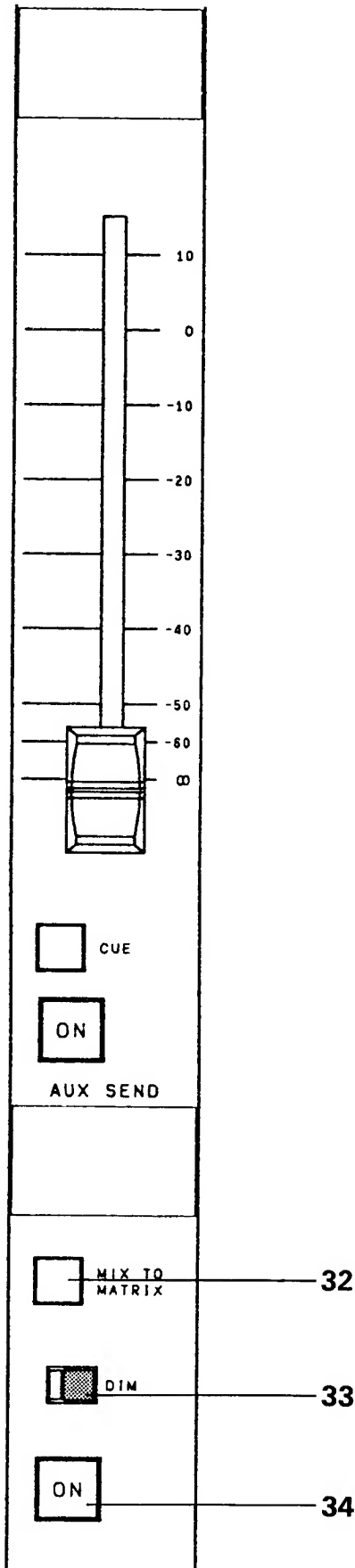
### 33. DIM

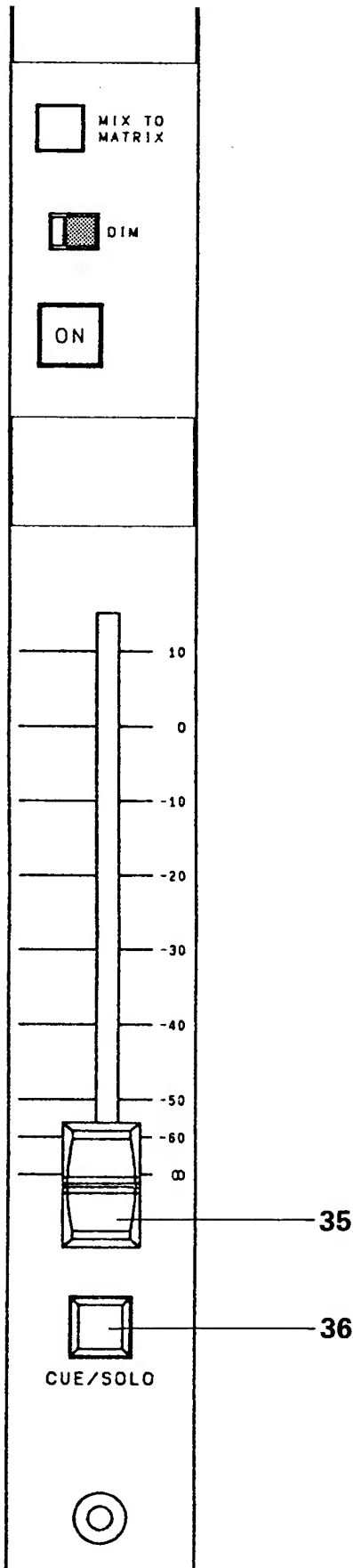
This switch mutes the mixing bus numbered the same as the module's master fader, lowering the level 6 dB. This provides a fast way to kill feedback without completely disrupting the monitor system; individual input channels (and/or mics) can then be examined to determine the source of the feedback, and appropriate steps taken so that the DIM function can be released. So long as the bus is dimmed, an LED next to the DIM switch is illuminated.

*NOTE: An internal jumper permits the amount of attenuation to be changed to -8 dB or -10 dB instead of the factory-set -6 dB (which represents one half the level). Refer to the OPTIONAL FUNCTIONS section of this manual for more information on this optional jumper function.*

### 34. ON (Mix Bus On)

This locking, yellow, illuminated switch turns on when the MIX OUT XLB is ON. When the bus' output is turned off, its signal may still be previewed with the mix bus CUE switch [36]. This switch does not affect the mix bus output to the matrix or the stereo bus. It does normally affect the Mix VU meter display, unless an internal jumper has been moved so the meter is driven from a point ahead of this ON/off switch.





### 35. (Mix Bus Out Fader)

This fader controls the audio signal level from the primary mixing bus which is applied to the MIX OUT connector (and to the matrix, as the console is shipped from the factory, although jumpers optionally enable each mix bus to be routed to the matrix pre-fader).

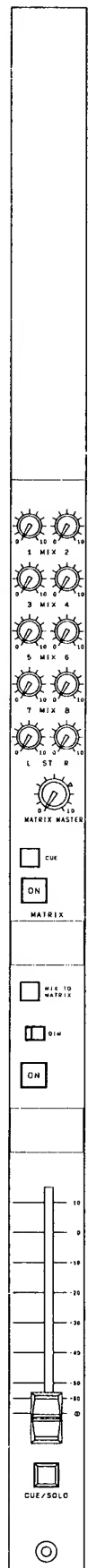
### 36. CUE (Mix Bus Cue)

Pressing this yellow illuminated switch part-way down causes momentary contact; pressing it further locks it down. When the CUE switch is illuminated, the module's MIX OUT signal (pre Mix Fader) adds to any master signal in the Cue output and the Phones output unless an input CUE switch is engaged. (Bus cue signals are overridden by input cue.) The Mix cue signal is mono, regardless of how many groups are cue'd.

## 2.1.3 The Mix B Modules

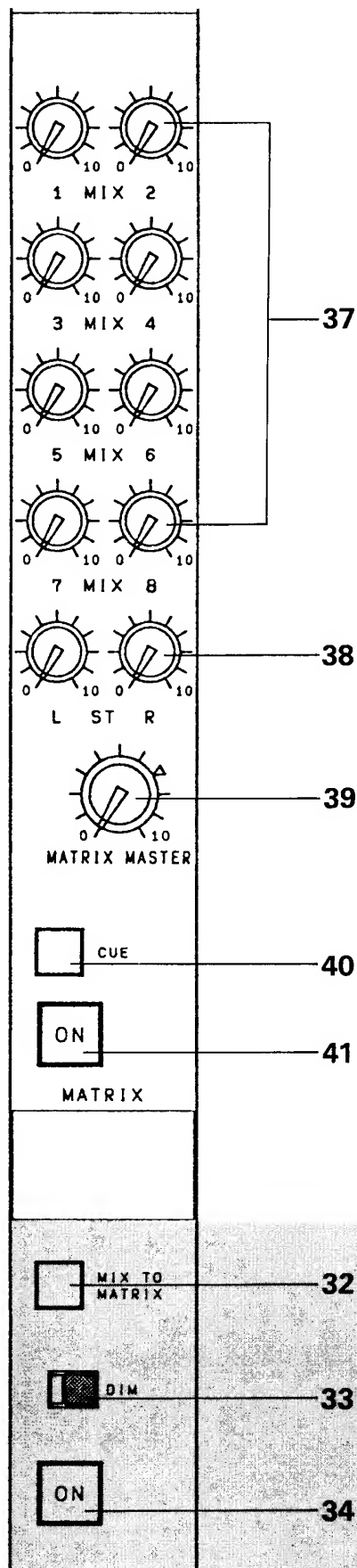
The mid section of the MIX B modules includes controls associated with the MIX MATRIX. Near the bottoms of these modules are located the Master Faders for Mix Busses 5 through 8, as well as associated bus ON, DIM, and other controls (identical to those on the MIX A modules).

The following description of one of these four modules covers only the MATRIX controls in the middle of the module, since the mix and aux controls are identical to those in the MIX A Mod-



**Figure 2-3. PM2800M Mix B Module (MB2800), Typical of Four Modules.**

## MATRIX SECTION



## 37. MIX 1, 2, 3, 4, 5, 6, 7, 8

**(Matrix Mix Level Controls for Mix Busses 1 – 8)**

These eight rotary controls adjust the level of signal from the correspondingly numbered primary mixing busses applied to the module's MATRIX OUT.

## 38. ST L, R

**(Matrix Mix Level Controls for the Stereo Bus)**

These two rotary controls adjust the level of the signal from the Left and Right sides of the STereo bus applied to the module's MATRIX OUT.

## 39. MATRIX MASTER

The Matrix Mix Level Controls (1, 2, 3, 4, 5, 6, 7, 8, L, R) permit a mono mix to be derived from the eight mix busses and the stereo bus. The MATRIX MASTER control then sets the overall level of this 10:1 mix just before it is routed to the MATRIX OUTPUT XLR connector.

## 40. CUE (Matrix Cue)

Pressing this yellow illuminated switch part-way down causes momentary contact; pressing it further locks it down. When the CUE switch is illuminated, the module's matrix mix signal (pre MATRIX MASTER) replaces any other signal in the Cue output and the Phones output unless an input CUE switch is engaged. (Bus cue signals are overridden by input cue.) The MATRIX CUE signal is Mono, regardless of how many matrix channels are cue'd.

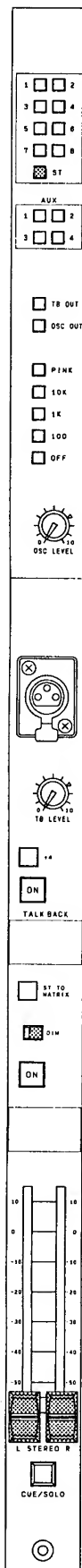
## 41. ON (Matrix On)

This locking, yellow, illuminated switch turns on when the MATRIX OUT XLR is ON. When the MATRIX OUT is turned OFF, its signal may still be previewed with the adjacent CUE switch [40].

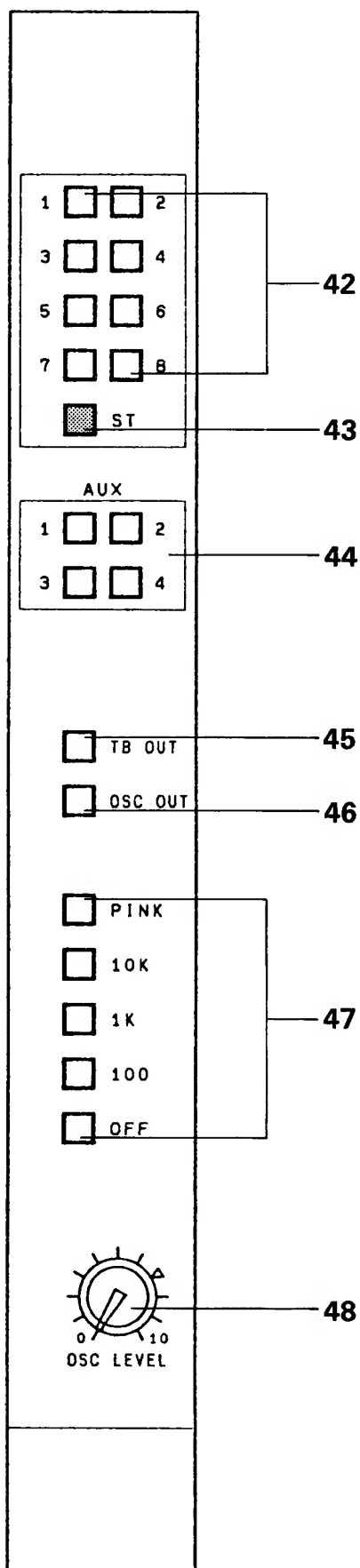
*Note: The rest of the controls and indicators below the ON switch [41] are identical to those on the MIX A modules previously described, and are not, therefore, repeated here.*

## 2.1.4 The Stereo/Talkback Module

This module contains the Talkback and Oscillator circuitry as well as the Stereo Master Fader and associated controls.



**Figure 2-4. PM2800M  
Stereo/Talkback  
Module (ST2800)**

**42. 1 2 3 4 5 6 7 8 (Mix Bus Assign)**

These locking switches assign the Talkback or oscillator signal to primary mixing busses 1 through 8.

**43. ST (Stereo Bus Assign)**

This locking switch assigns the Talkback or oscillator signal to the STereo bus; the mono signal is applied equally to the left and right sides of the bus.

**44. AUX 1 - 4 (Assign)**

These four locking switches assign the TB/OSC signal directly to the correspondingly numbered auxiliary mixing busses.

**45. TB OUT**

This locking switch turns the TB OUT XLB connector on and off. It affects only the TB meter feed and output of the talkback system which appears at the TB OUT connector (the output being derived from the TB input when the TALKBACK ON switch is pressed, or otherwise from the oscillator). This switch does not affect any TB/OSC signal which may be switch-assigned to primary mixing busses 1-8, the stereo bus or the four aux mixing busses.

**46. OSC OUT**

This locking switch turns the OSC OUT XLB connector on and off. It affects only the OSC meter feed and output of the oscillator that appears at this connector, and does not affect any oscillator signal which may be switch-assigned to primary mixing busses 1-8, the stereo bus or the four aux mixing busses.

**47. PINK 10K 1K 100 OFF**

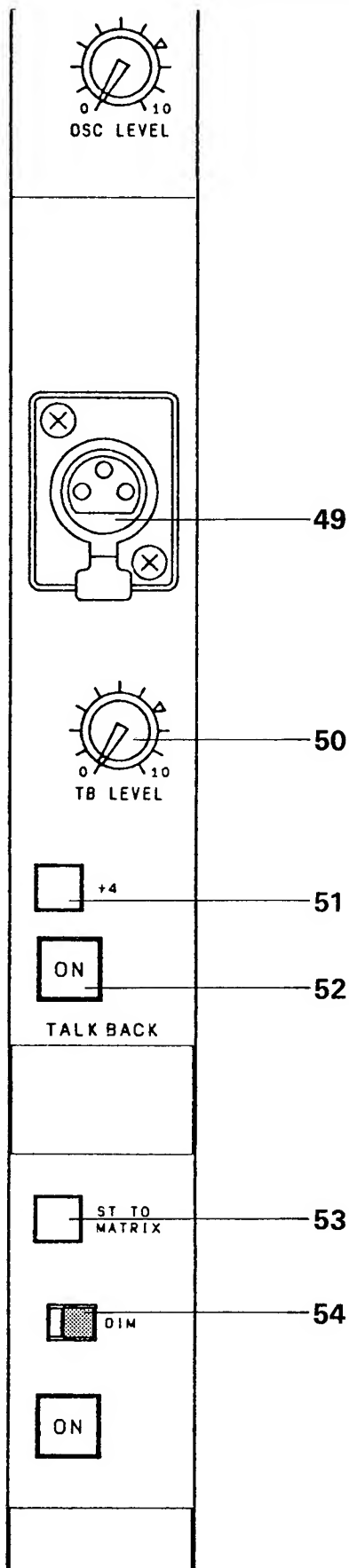
These 5 interlocking switches set the oscillator to 100 Hz, 1 kHz or 10 kHz operation. They also permit selection of a pink noise source, or turn off the oscillator/noise source altogether.

*NOTE: To prevent any possible leakage into mixing busses, the oscillator should be shut OFF when not actually in use.*

**48. OSC LEVEL**

This rotary control adjusts the oscillator output level applied to the OSC OUT connector as well as any mixing busses to which the signal may be assigned. This control does not affect the Talkback level.





#### 49. (TB INPUT)

This XLB-3 connector accepts a low-Z microphone or a line level signal, depending on the settings of the controls below it. This input is NOT phantom powered. Signal from this input is assigned to the TB OUT connector and to the various mixing busses by means of the assignment switches in the upper portion of this module [42], [43], [44], [45].

#### 50. TB LEVEL

This rotary control adjusts the signal level after the talkback preamplifier, thereby affecting the sensitivity of the TB input whether it is set for a mic or line source. This control affects the TB level applied to any busses and to the TB OUT connector; it does not affect the oscillator level in any way.

#### 51. +4 (Line Pad)

This locking switch inserts a *54 dB pad* after the XLB talkback input. The pad decreases the sensitivity of that input from nominal *-50 dBu* (for a microphone) to *+4 dBu* (for a line level input, hence the “+4” label).

#### 52. ON (Talkback ON)

Pressing this yellow illuminated switch part-way down causes momentary contact; pressing it further locks it down. The switch activates the XLB talkback input [49] and applies signal from that input to any assigned busses (and to the TB OUT connector if the TB OUT switch [45] is also on). When the TALKBACK ON switch [52] is off (not illuminated), the *oscillator* output is instead routed to any assigned busses (and to the TB OUT connector). This ON switch does not, however, affect the OSC OUT connector.

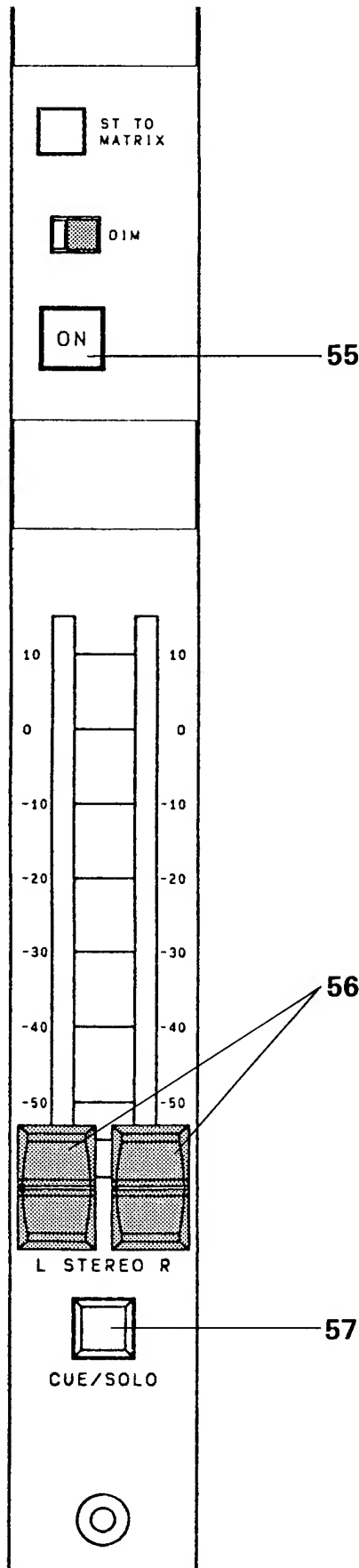
#### 53. ST TO MATRIX

Engaging this locking switch assigns signal from the module's STEREO OUT (ahead of the Stereo ON switch [55]) to the matrix' stereo bus (which drives the rotary ST L & R mix controls on the MIX B modules).

*NOTE: The signal is assigned to the matrix by a jumper within the ST/TB module. As shipped, the stereo bus feed to the matrix comes after the Stereo Master Fader; a jumper may be moved within the module to obtain a pre-Stereo Master Fader feed to the matrix. Refer to the OPTIONAL FUNCTIONS section of this manual for more information on this optional jumper function.*

#### 54. DIM

This switch mutes the stereo bus, lowering the level 6 dB. This provides a fast way to kill feedback without completely disrupting the monitor system; individual input channels (and/or mics) can then be examined to determine the source of the feedback, and appropriate steps taken so



that the DIM function can be released. So long as the stereo bus is dimmed, an LED next to this DIM switch is illuminated.

*NOTE: An internal jumper permits the amount of attenuation to be changed to -8 dB or -10 dB instead of the factory-set -6 dB (which represents one half the level). Refer to the **OPTIONAL FUNCTIONS** section of this manual for more information on this optional jumper function.*

#### 55. ON (Stereo Out ON)

This locking, yellow, illuminated switch turns on when the stereo output is ON, indicating the post-fader signal is applied to the L and R stereo outputs. The STEREO VU meters will not operate if this switch is OFF, but the stereo signal may still be previewed with the CUE switch [57].

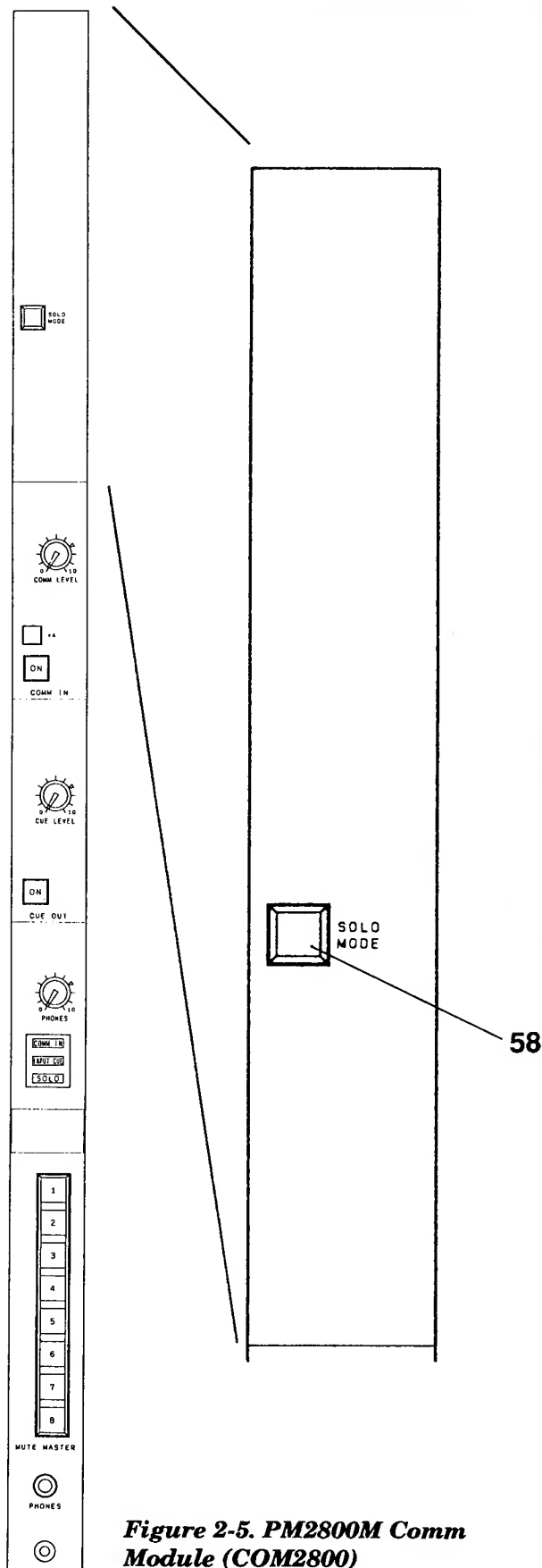
*Note: This switch does not affect the send to the matrix; whether this switch is on or off, the matrix send remains ON.*

#### 56. (Stereo Fader)

This pair of adjacent faders adjusts the level applied from the left and right sides of the stereo mixing bus to the STEREO OUT XLB connectors. The knobs are close enough to be moved together with a single finger, but can easily be offset for balance adjustments (or for discrete output level adjustments when the two sides of the stereo bus are used for separate, unrelated mixes).

#### 57. CUE (Stereo Cue)

Pressing this yellow illuminated switch part-way down causes momentary contact; pressing it further locks it down. When the CUE switch is illuminated, this stereo signal is applied to the Cue output and the Phones output unless an input CUE switch is engaged. (Bus cue signals are overridden by input cue.) This switch provides the headphones with a stereo cue signal.



## 2.1.5 The Comm Module

### 58. SOLO MODE

This locking, red, illuminated switch flashes when engaged, indicating the console monitor system is set to the SOLO mode. (A red LED annunciator [65] also flashes to warn of the selected SOLO mode.) The switch is recessed to prevent accidental engagement. In the solo mode, input channel CUE/SOLO switches mute all other channels, much like a recording console SOLO function. This mode is useful during setup and sound check for a live show.

When the console is in SOLO mode, the aux return CUE switches have a solo function, but it is not quite like the input channel solo function. Pressing an aux return CUE switch in SOLO mode will mute all input channels (except those whose CUE/SOLO switch is engaged), and the soloed aux return will be heard, but so, too, will all other aux returns. (To silence the other returns, turn them off by disengaging their ON/off switches.)

The normal mode of operation during a show, CUE mode, is entered by releasing the SOLO MODE switch; in the cue mode, input CUE/SOLO switches do not mute other channels, but merely replace the signal which appears in the Phones output.

**CAUTION:** Be sure to disengage the solo mode, and confirm the console is in the cue mode, prior to the beginning of a performance. Otherwise pressing any input channel CUE/SOLO switch will mute all other channels.

**Figure 2-5. PM2800M Comm Module (COM2800)**

## COMM IN SECTION

A rear-panel COMM IN (Communications Input) [91] connector enables almost any intercom system to be used to communicate with the PM2800M console operator; or the stage manager's mic can be plugged in. When an audio signal is applied to this input, and the controls on this module (described below) are appropriately set, then the COMM IN light will turn on. Pressing the COMM IN ON switch then replaces any signal in the PHONES and CUE OUT with the COMM IN signal.

The COMM IN may also be used in conjunction with the TB out from another PM2800M or some other stage monitor mixing console, a PM1800 or PM3000 console, or with a signal from a stage manager's mic (+4 switch [60] not engaged so that COMM IN is set for mic level sensitivity). In any of these instances, someone talking at a remote location can visually signal the PM2800M operator merely by speaking, and can then be heard if the PM2800M operator engages the COMM IN ON switch [61].

### 59. COMM LEVEL

This rotary control adjusts the signal level after the COMM IN preamplifier, thereby affecting the sensitivity of the COMM input whether it is set for a mic or line source. This control affects the COMM level applied to the Phones output and to the Cue output, which are the only points to which COMM IN signal may be applied.

### 60. +4 (Line Pad)

This locking switch inserts a 54 dB pad after COMM IN XLB input. The pad decreases the sensitivity of that input from nominal -50 dBu (for mic level) to +4 dBu (for line level).

### 61. COMM IN (Communication input ON/off switch)

Pressing this yellow illuminated switch replaces any CUE signal in the CUE OUTPUT with the COMM IN signal. It also interrupts the PHONES output and replaces it with the COMM IN signal.

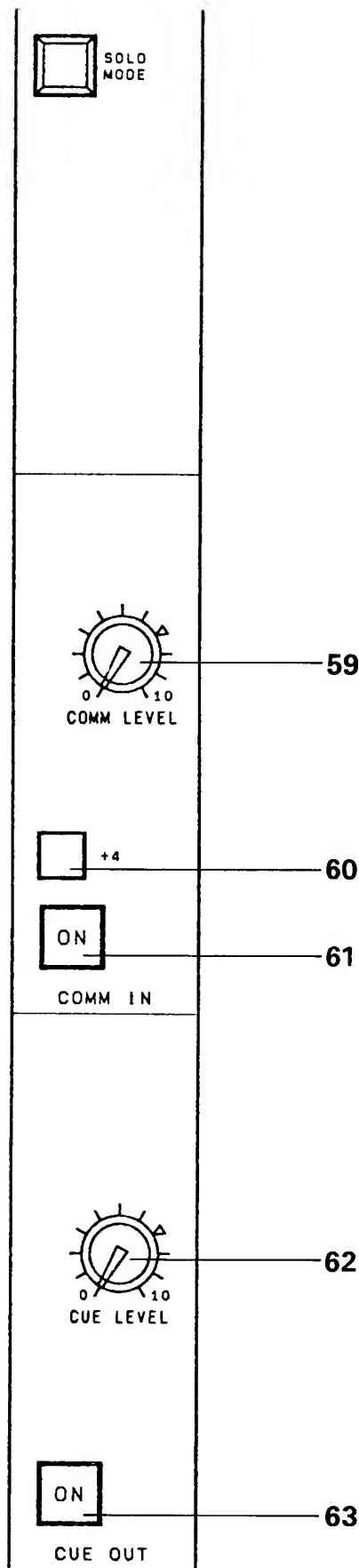
## CUE OUT MASTER SECTION

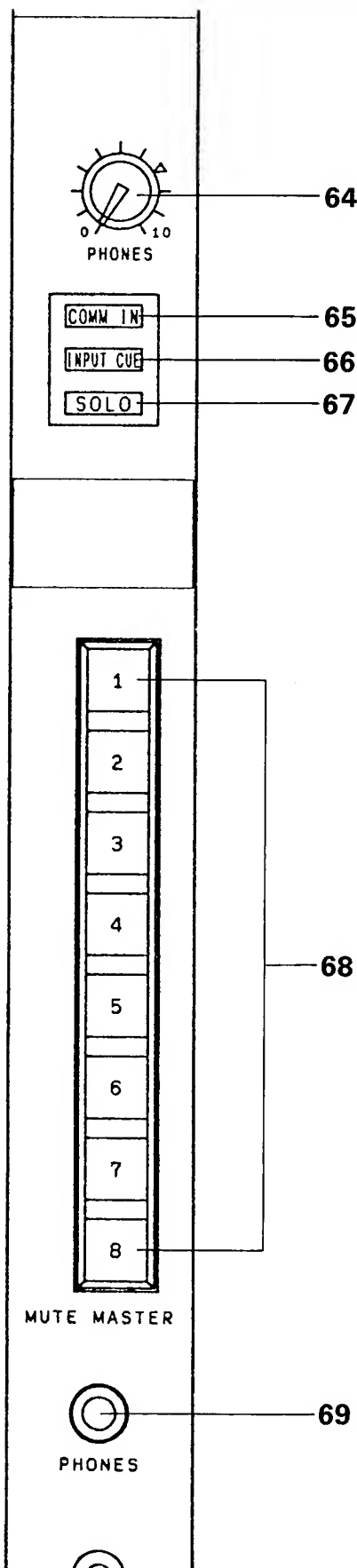
### 62. CUE LEVEL

This rotary, 2-gang (stereo) control adjusts the output level applied to the CUE OUT L & R connectors. It does not affect any cue signal which may be applied to the PHONE outputs.

### 63. CUE OUT (Cue output ON/off switch)

Engaging this yellow, illuminated switch turns on the CUE OUT L & R connectors. This switch does not affect the PHONES outputs.





#### 64. PHONES (Level control)

This 2-gang rotary control adjust the output level at the stereo PHONES output jack. It affects any signals which may be fed to these outputs.

### LED ANNUNCIATORS

#### 65. COMM IN

This LED flashes green in response to almost any level signal appearing at the COMM input. (It will not respond to a low level signal (i.e., a mic input) if the "+4" COMM input pad is engaged.) This signals the console operator that someone is attempting to communicate so that the COMM IN ON switch can be engaged.

#### 66. INPUT CUE

This yellow LED turns on when any input channel's CUE/SOLO switch or any AUX RETURN CUE switch is engaged, indicating the console is subject to input cue priority. This is an indication that the signal in the headphones output is being derived from one or more inputs via the cue system. The indicator operates the same whether the console is in cue or solo mode.

#### 67. SOLO

This LED flashes red if the console is in the SOLO mode. This serves as an urgent warning that if any input CUE/SOLO switch (or aux return CUE switch) is depressed, that all input channels will be muted except the soloed channel(s).

**CAUTION:** *If this LED is flashing during a performance, DO NOT press any input CUE/SOLO or aux return CUE switch. Instead, disengage the SOLO MODE switch [58]. This will prevent program interruption when attempting to cue an input.*

#### 68. MUTE MASTER 1 – 8

Engaging any of these locking, yellow illuminated switches mutes (turns off) any input channel(s) whose correspondingly numbered MUTE switch is engaged. An input channel will not be muted, however, if its MUTE SAFE switch is engaged.

#### 69. PHONES

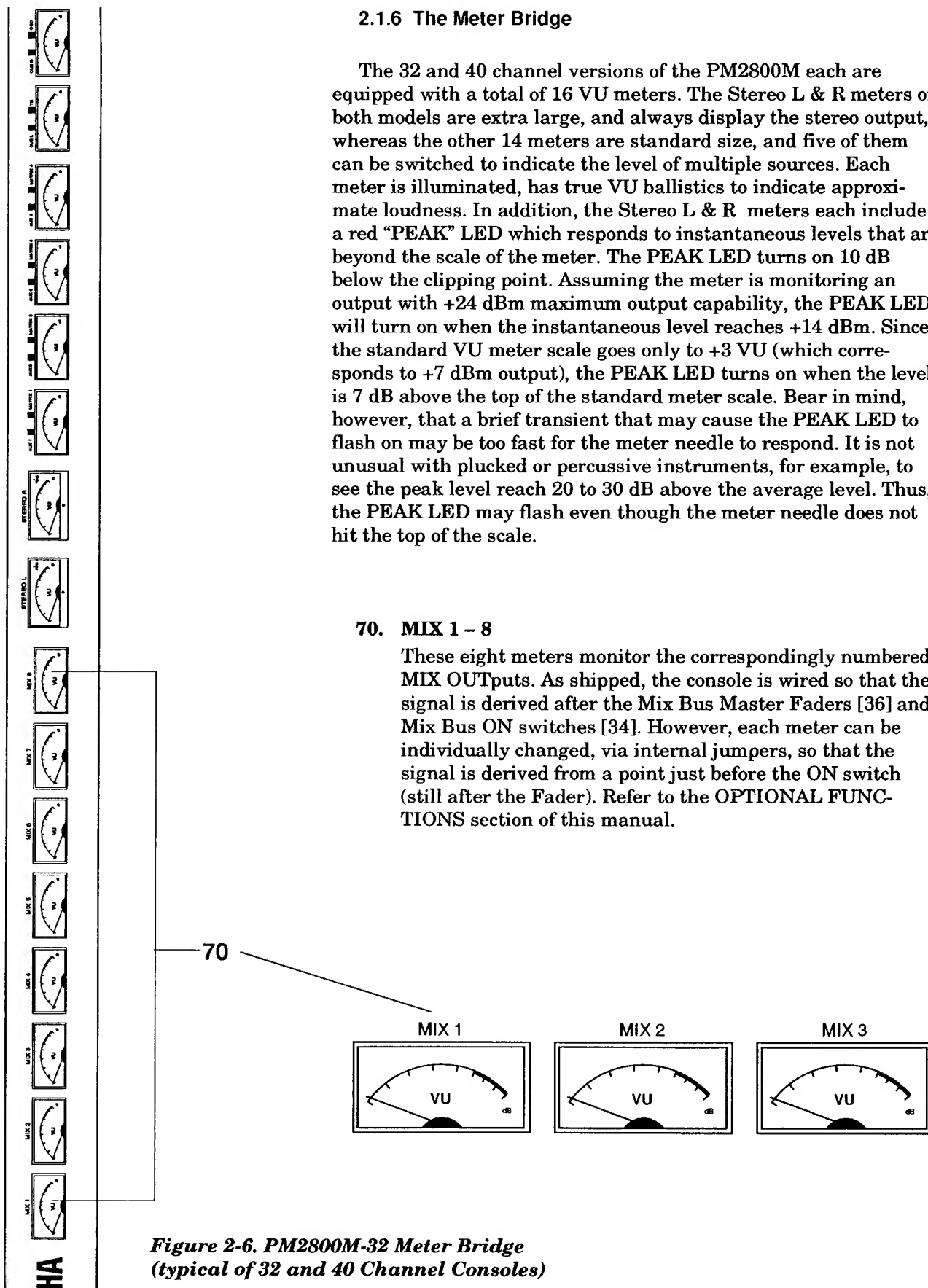
This 1/4" (6.33mm) stereo phone jack can accommodate a pair of standard 8-ohm or higher impedance stereo headphones.

### 2.1.6 The Meter Bridge

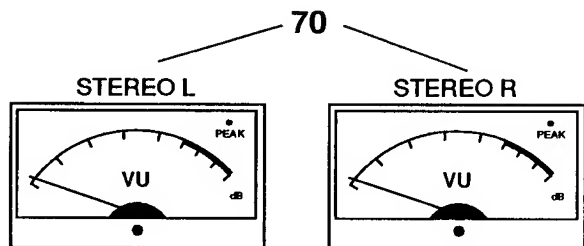
The 32 and 40 channel versions of the PM2800M each are equipped with a total of 16 VU meters. The Stereo L & R meters on both models are extra large, and always display the stereo output, whereas the other 14 meters are standard size, and five of them can be switched to indicate the level of multiple sources. Each meter is illuminated, has true VU ballistics to indicate approximate loudness. In addition, the Stereo L & R meters each include a red "PEAK" LED which responds to instantaneous levels that are beyond the scale of the meter. The PEAK LED turns on 10 dB below the clipping point. Assuming the meter is monitoring an output with +24 dBm maximum output capability, the PEAK LED will turn on when the instantaneous level reaches +14 dBm. Since the standard VU meter scale goes only to +3 VU (which corresponds to +7 dBm output), the PEAK LED turns on when the level is 7 dB above the top of the standard meter scale. Bear in mind, however, that a brief transient that may cause the PEAK LED to flash on may be too fast for the meter needle to respond. It is not unusual with plucked or percussive instruments, for example, to see the peak level reach 20 to 30 dB above the average level. Thus, the PEAK LED may flash even though the meter needle does not hit the top of the scale.

#### 70. MIX 1 – 8

These eight meters monitor the correspondingly numbered MIX OUTputs. As shipped, the console is wired so that the signal is derived after the Mix Bus Master Faders [36] and Mix Bus ON switches [34]. However, each meter can be individually changed, via internal jumpers, so that the signal is derived from a point just before the ON switch (still after the Fader). Refer to the OPTIONAL FUNCTIONS section of this manual.



**Figure 2-6. PM2800M-32 Meter Bridge**  
(typical of 32 and 40 Channel Consoles)



#### 71. STEREO L & R

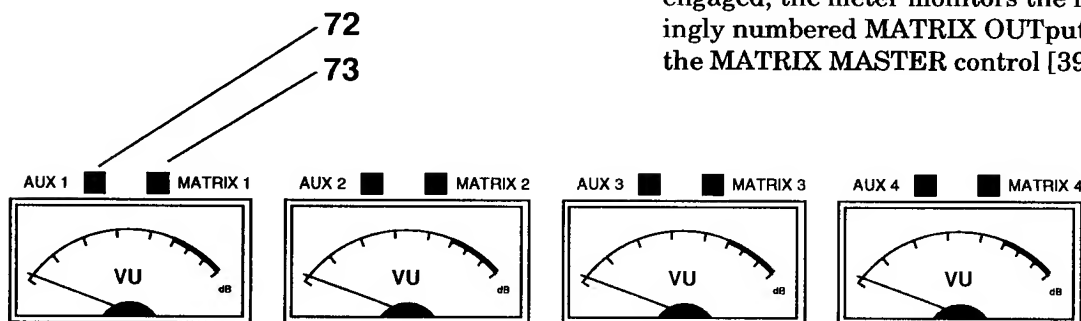
This pair of meters monitor the left and right sides of the STEREO OUTputs.

#### 72. AUX 1 - 4 (Meters & Switches)

When the AUX switch above each of these four meters is engaged, the meter monitors the level on the correspondingly numbered AUX OUTput. Signal is derived after the AUX SEND Master Fader [29] and ON switch [31].

#### 73. MATRIX 1 - 4 (Meters & Switches)

When the MTRX switch above each of these four meters is engaged, the meter monitors the level on the correspondingly numbered MATRIX OUTput. Signal is derived after the MATRIX MASTER control [39] and ON switch [41].



#### 74. CUE L & R (Meters & Switches)

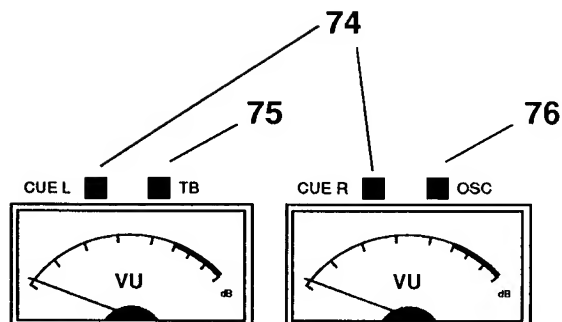
When the MTRX switch above each of these two meters is engaged, the meter monitors the level on the correspondingly left or right CUE OUTput. Signal is derived after the CUE LEVEL control [62] and ON switch [63]; this level is *not affected* by the PHONES level control [64].

#### 75. TB (Meter & Switch)

When the TB switch above this meter is engaged, the meter monitors the level of the Talkback Output (TB OUT). The signal is derived after the TB LEVEL control [50] and TB OUT switch [45]. Note that when the TB OUT switch [45] is engaged but the TB input ON switch [52] is *not engaged*, this meter will display the level of any oscillator signal if the oscillator is turned on.

#### 76. OSC (Meter & Switch)

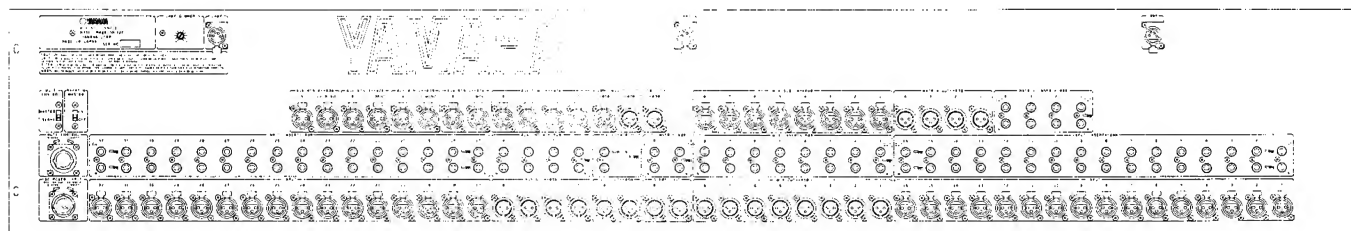
When the OSC switch above this meter is engaged, the meter monitors the level of the OSCillator OUTput. The signal is derived after the OSCillator LEVEL control [48] and OSC OUT switch [46]. Also, one of the oscillator function switches other than OFF [47] (i.e., PINK, 10K, 1K or 100) must be engaged in order for there to be any output or meter indication.



## 2.2 PM2800M Rear Panel Features

All output XLB connectors are balanced, XLB-3 type, nominal +4 dBu level unless otherwise noted. INSERT IN/OUT jacks are wired in a “normalled” configuration; as long as the IN jack is not used, the OUT jack is internally wired to it for signal continuity. The OUT jack may be used as a direct output without interrupting signal flow through the console. INSERT INs and OUTs are unbalanced and operate at -6 dBu level (providing added input sensitivity for lower level processors or line inputs). They are pre-Fader, EQ & Filter.

Input channel XLBs are electronically balanced, as supplied. Optional input isolation transformers may be installed on a module-by-module basis; refer to Section 6. Output XLBs are also electronically balanced. Optional output isolation transformers are available in an external package housing four (OT1800) or eight (OT3000) transformers. In this way, inputs and outputs can be provided with extra grounding isolation and common mode rejection where required, but one need not pay the price in direct costs, weight or signal quality where the transformers are not needed.



**Figure 2-7. PM2800M-32 Rear Panel  
(Similar to 40 Channel Console)**



**77. INPUT (1 – 32, or 1 – 40)**

These INPUT connectors, 32 or 40 female XLBs depending on the model of PM2800M, are divided into two groups (on either side of the center control area of the console). These XLBs apply signal to the correspondingly numbered input modules. The nominal input level may vary from -60 dBu to +4 dBu depending on the settings of the individual input GAIN controls and PAD switches.

**78. INPUT CHANNEL INSERT IN (1 – 32, or 1 – 40)**

These 32 or 40 unbalanced 1/4" Tip/Ring/Sleeve phone jacks apply signal to the input channel just ahead of the EQ and fader. Nominal input level is -6 dBu (388 mV). These jacks are "normalled" so that inserting a plug interrupts the internal signal flow through the channel, instead bringing in the return from an auxiliary signal processor.

**79. INPUT CHANNEL INSERT OUT (1 – 32, or 1 – 40)**

These 32 or 40 unbalanced 1/4" (6.33 m) Tip/Sleeve phone jacks output the signal from the input channel (just after the GAIN control, PAD and phase (polarity) switch but before the EQ or fader). Nominal output level is -6 dBu (388 mV). These jacks may be used as auxiliary outputs to another console or as direct outs to a multitrack tape machine. They are intended, however for sending the input

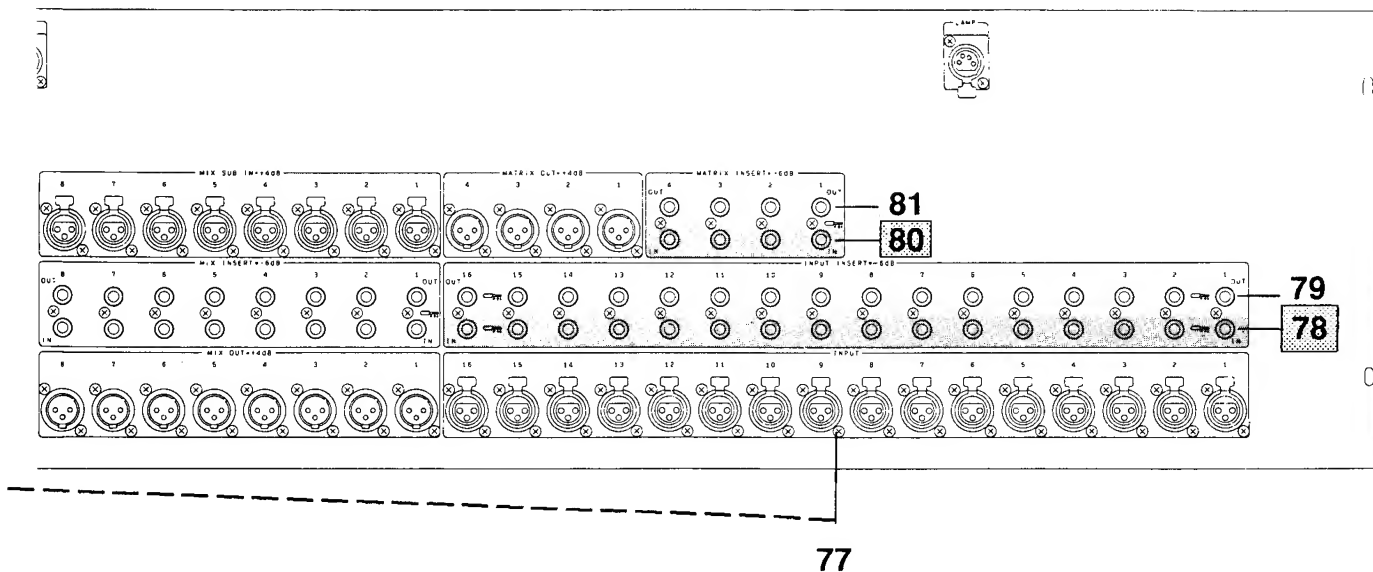
channel signal to an auxiliary signal processor (compressor, graphic EQ, noise gate, etc). INSERT OUT is always "live" whether or not the channel is on.

**80. MATRIX INSERT IN (1 – 4)**

These 4 unbalanced 1/4" Tip/Ring/Sleeve phone jacks apply signal to the correspondingly numbered matrix mix just ahead of the MATRIX MASTER control [39]. Nominal input level is -6 dBu (388 mV). These jacks are "normalled" so that inserting a plug interrupts the internal signal flow through the matrix channel. Each of these inputs may be used to bring in the return from an auxiliary signal processor (compressor, graphic EQ, etc.) or to temporarily bypass the matrix channel mix by inserting a different signal to feed that matrix output.

**81. MATRIX INSERT OUT (1 – 4)**

These 4 unbalanced 1/4" (6.33 m) Tip/Sleeve phone jacks output the signal from the correspondingly numbered matrix mix just before the MATRIX MASTER control [39]. Nominal output level is -6 dBu (388 mV). These jacks may be used as auxiliary outputs to another console or as direct outs to a multitrack tape machine. They are intended, however for sending the matrix mix to an auxiliary signal processor (compressor, graphic EQ, noise gate, etc). INSERT OUT is always "live" whether or not the matrix mix is switched on.



**82. MATRIX OUT (1 – 4)**

These four male connectors output signal from the four 10:1 matrix mixes, after the MATRIX MASTER controls [39] and ON/off switches [41]. They may be used for feeding the same keyboard mix to two sets of keyboards, for sending a given solo mix to different monitor speakers as the soloist moves around stage (i.e., like an audio “follow spot”), and more. In other situations, the matrix can be used to create mono or stereo tape recorders, to create additional effects sends comprised of combined signals from the mix busses, or to create remote feeds (including feeds to the main “house” mixing console).

**83. MIX INSERT IN (1 – 8)**

These eight unbalanced 1/4" (6.33mm) Tip/Ring/Sleeve phone jacks apply signal to the Mix Master faders [35]. These jacks accept the return from any auxiliary signal processor used to affect these primary mixing bus signals.

**84. MIX INSERT OUT (1 – 8)**

These eight unbalanced 1/4" (6.33mm) Tip/Sleeve phone jacks output the signal from the primary mixing busses just ahead of the Mix Master faders [35]. These jacks are intended for sending the mix bus signals to auxiliary signal processors (compressors, graphic EQs, noise gates, etc). In certain applications, they

may be used as auxiliary mix outputs to a multitrack tape recorder or another console.

**85. MIX SUB IN (1 – 8)**

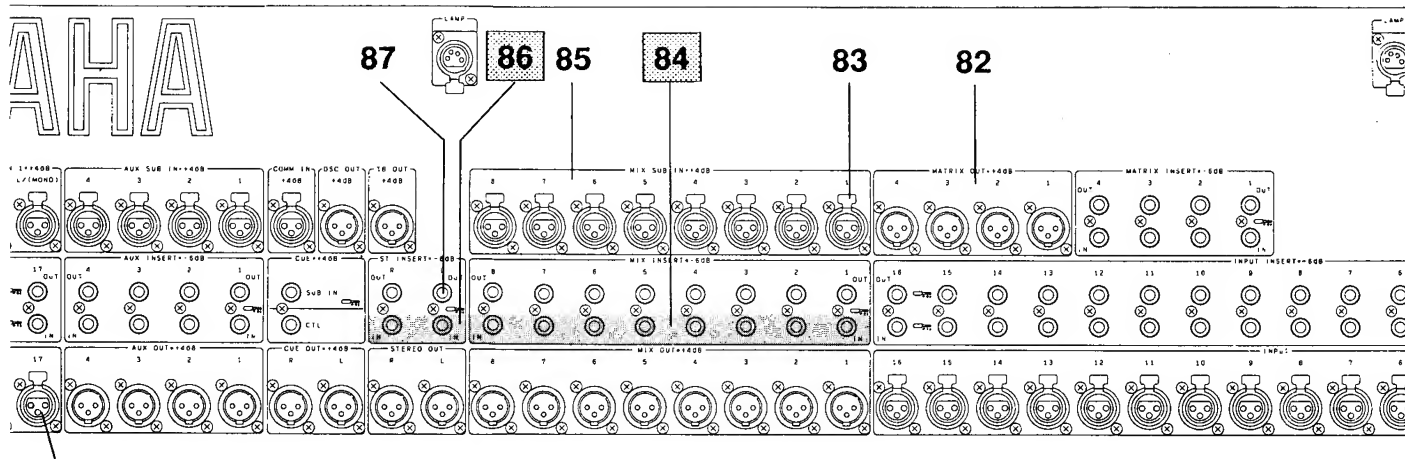
These eight female XLB connectors apply signal directly to the primary mixing busses (ahead of the Mix Master Faders). They are used for “chaining” another mixing console’s outputs into this console, with this console serving as the master for both consoles. In this way, for example, a PM2800M-32 and a PM2800M-40 could be linked to provide a 72 input monitor mixing system.

**86. ST INSERT IN (L & R)**

These two unbalanced 1/4" (6.33mm) Tip/Ring/Sleeve phone jacks apply signal to the Stereo Master faders [56]. These jacks accept the return from any auxiliary signal processor used to affect the stereo bus signals.

**87. ST INSERT OUT (L & R)**

These two unbalanced 1/4" (6.33mm) Tip/Sleeve phone jacks output the signal from the stereo mixing bus just ahead of the Stereo Master faders [56]. These jacks are intended for sending the stereo bus signals to auxiliary signal processors (compressors, graphic EQs, noise gates, etc). In certain applications, they may be used as auxiliary outputs to a stereo tape recorder or another console.



## 88. TB OUT

This male XLB connector outputs signal from the talkback circuit when the TB OUT switch [45] is on. If that switch is OFF, this output is muted. Assuming the TB OUT switch [45] is on and the TALKBACK switch [52] is engaged, this output is derived from the talkback input XLB. Otherwise, if the TALKBACK switch [52] is not engaged, the TB OUT is derived from the console's oscillator/noise generator.

The TB OUT may be fed to the IFB (Interruptible Foldback) program input of an intercom system in order that the console operator can talk into the intercom system. In some cases, it can be applied to an auxiliary program audio input or some other input on a standard intercom system (see Section 7). It also may be fed to a monitor console's COMM input, or to a console's input channel (which is monitored via CUE) to enable the PM2800M operator to communicate with the other console's operator.

## 89. OSC OUT

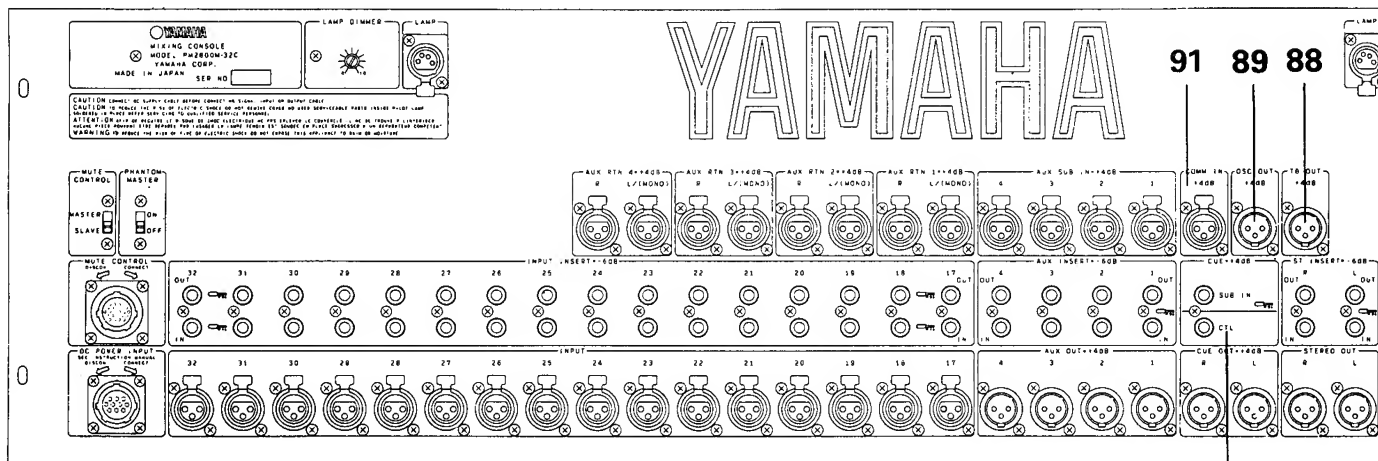
This male XLB connector outputs signal from the console's oscillator/noise generator when the OSC OUT switch [46] is on. In order to actually obtain any output signal, however, the oscillator must be switched on [47], and the OSC LEVEL control [48] must be turned up.

## 90. CUE (SUB IN and CTRL)

These are 1/4" (6.33 mm) Tip/Ring/Sleeve phone jacks designed to link the cue systems of two PM2800M consoles (or a PM2800M with a PM1800 or PM3000). CUE SUB IN applies audio (which should come from CUE OUT of another console) directly to the cue mixing bus. CUE CTRL (CONTROL) provides direct access to the console's cue/solo control bus. It serves as either an input or an output. When the CUE CONTROL jacks of two consoles are interconnected, pressing an input CUE/SOLO switch or any CUE switch on one console causes both consoles to enter the cue (or solo) mode. Provided that CUE SUB IN is linked to the other console's CUE OUT, all cued or soloed signals can be monitored by the "master" console.

## 91. COMM IN

This female XLB connector accepts mic or line level signals from another console (i.e., from TB OUT on another console), or from most professional intercom systems, although an adaptor will be required to accommodate certain types of intercoms. This is a "1-way" connection in that it accepts the audio from the intercom line, but does not apply audio back onto the line. Refer to Section 7. for instructions on interface to popular intercom systems.



**92. AUX INSERT IN (1 - 4)**

These four 1/4" (6.33mm) Tip/Ring/Sleeve phone jacks are nearly identical to the MIX INSERT IN jacks [83], except they return signal to a point just ahead of the AUX SEND master faders [29]. (The circuit is unbalanced even though these are T/R/S jacks.)

**93. AUX INSERT OUT (1 - 4)**

These four unbalanced 1/4" (6.33mm) Tip/Sleeve phone jacks are nearly identical to the MIX INSERT OUT jacks [84], except they output signal from just ahead of the AUX SEND master faders.

**94. AUX SUB IN (1 - 4)**

These four female XLB connectors apply signal directly to the auxiliary mixing busses (ahead of the AUX INSERT jacks [93, 94] and AUX SEND faders [29]). They are used for "chaining" another mixing console's aux send outputs into this console, with this console serving as the master for both consoles.

**95. AUX RETURN (1 - 4, L/MONO and R)**

These eight female XLB connectors accept auxiliary return signals. Each pair of L/MONO and R connectors can be used for a stereo return, or the L/MONO connector may be used for a monaural return (provided the corresponding front-panel MONO switch is engaged [24]). They may be used as auxiliary line inputs if they are not being used for effects returns.

**96. (Lamp Sockets)**

These four-pin female XLB type connectors provide dimmer-controlled DC power for miniature lamps on flexible stalks (the lamps are an optional accessory). There are three light sockets on the 32 channel mainframe, and four on the 40 channel mainframe. Maximum output is 12 volts. (Pins 1 and 2 of the XLB type are not used, pin 3 is the 12 volt supply, and pin 4 is DC ground.)

**97. LAMP DIMMER**

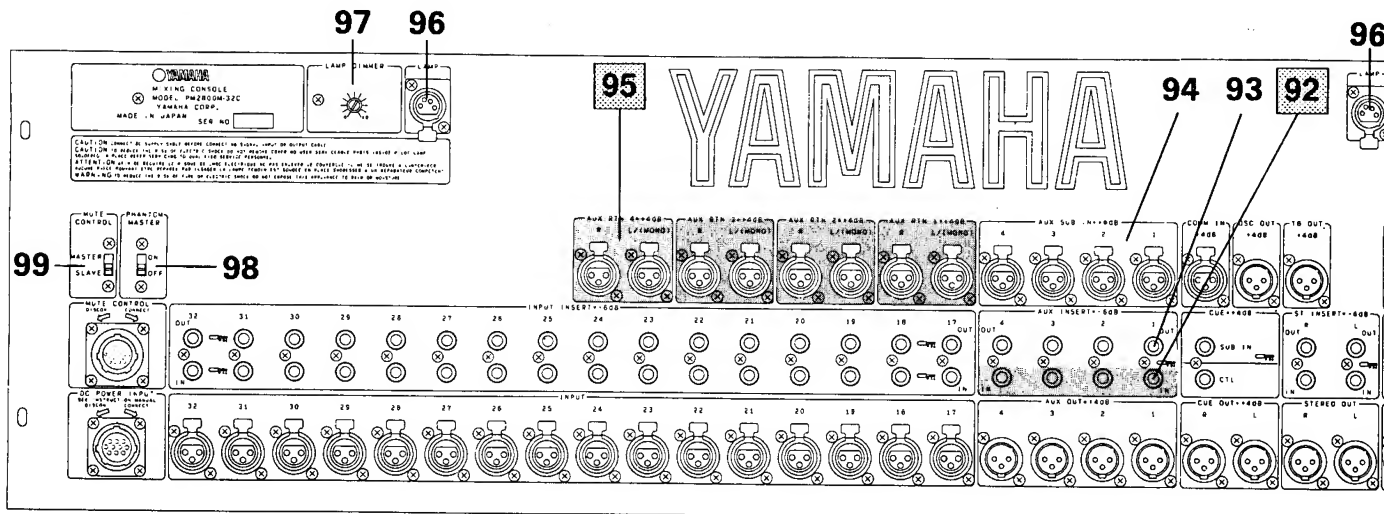
This rotary, screwdriver-adjustable dimmer turns the lamp socket power off, or on to a variable intensity from low to high brightness.

**98. PHANTOM POWER MASTER**

This recessed slide switch turns the console's 48-volt phantom power supply on and off. When this is OFF, no power will be supplied to any mic, regardless of the channel's +48 V on/off switch setting [10].

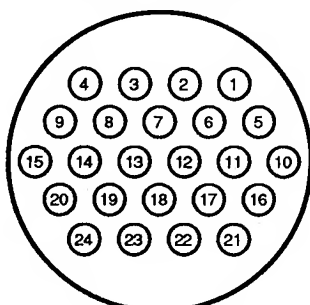
**99. MUTE SLAVE/MASTER**

Setting this recessed slide switch to MASTER position configures the console for local control of input channel muting via the MASTER MUTE switches [68]. SLAVE position disables this console's MASTER MUTE switches and, instead, allows a second PM2800M (or appropriately wired remote switch closures) to control this console's master muting via the MUTE CONTROL connector [100].



## 100. MUTE CONTROL

This multi-pin locking connector is an input/output point for control voltages in the PM2800M. It enables two PM2800Ms to be interlinked so that the muting logic from one console also affect the other. The adjacent MUTE CONTROL MASTER/SLAVE Switch [99] affects the function of this connector. This connector also may be used for interface to a remote control system which may be developed for "automation" of master muting.



CONNECTOR PINS  
(FEMALE)

PIN N°	FUNCTION	PIN N°	FUNCTION
1	NC	13	MUTE BUS 3
2	NC	14	MUTE BUS 4
3	NC	15	MUTE BUS 5
4	NC	16	MUTE BUS 6
5	NC	17	MUTE BUS 7
6	NC	18	MUTE BUS 8
7	NC	19	GND
8	NC	20	GND
9	NC	21	GND
10	NC	22	NC
11	MUTE BUS 1	23	NC
12	MUTE BUS 2	24	NC

Figure 2-8. Mute Connector Pin Assignments

## 101. DC POWER IN

This multi-pin, locking connector accepts a special umbilical cable from the console's external power supply (Model PW2800 ). Be sure the locking ring is securely hand tightened to avoid inadvertent disconnection.

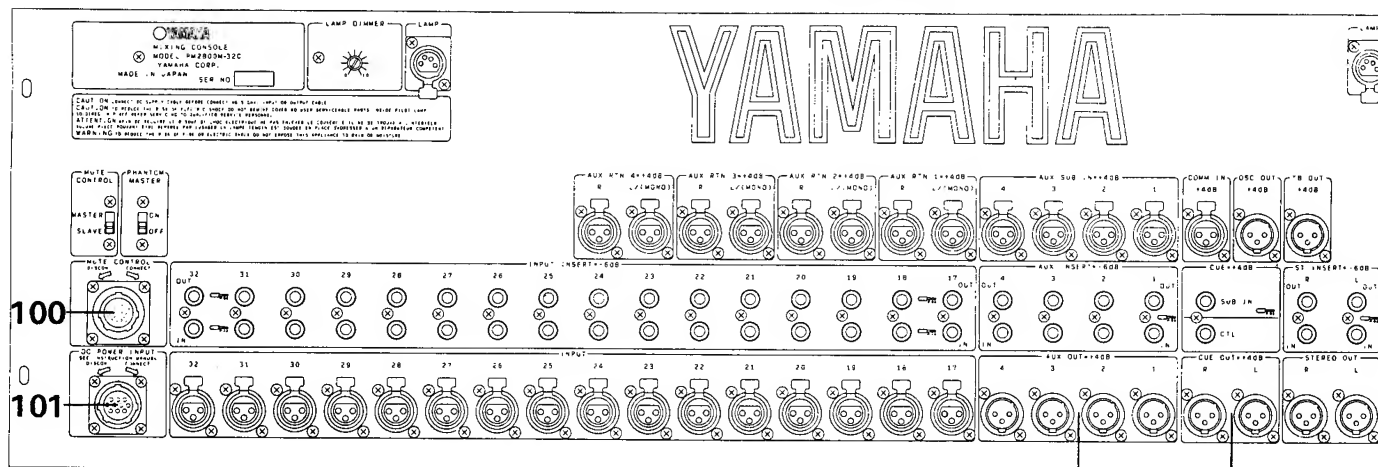
*NOTE: The same PW2800 power supply and cable are used for both 32 or 40 channel mainframes. However, different power supplies will be necessary for different voltages in various parts of the world; be sure you verify you have the correct supply for your power mains.*

## 102. AUX OUT (1 - 4)

These four male XLB connectors output signal from the four auxiliary mixing busses, just after the AUX SEND master faders [29]. They may be used for echo/effects sends, for additional stage monitor mixes, for auxiliary mono or stereo program feeds to remote locations and/or tape recorders, and so forth.

## 103. CUE OUT (L, R)

This pair of male XLB connectors output the same signal which appears at the PHONES output jacks. Unlike the PHONES output, however, these are separate, balanced left and right outputs. Moreover, the CUE OUT connectors may be muted with the front panel CUE OUT ON/off switch [63]. These connectors are useful for driving monitor amps and speakers for the console operator, or (for multiple operators) a special headphone distribution system that employs an external power amp.

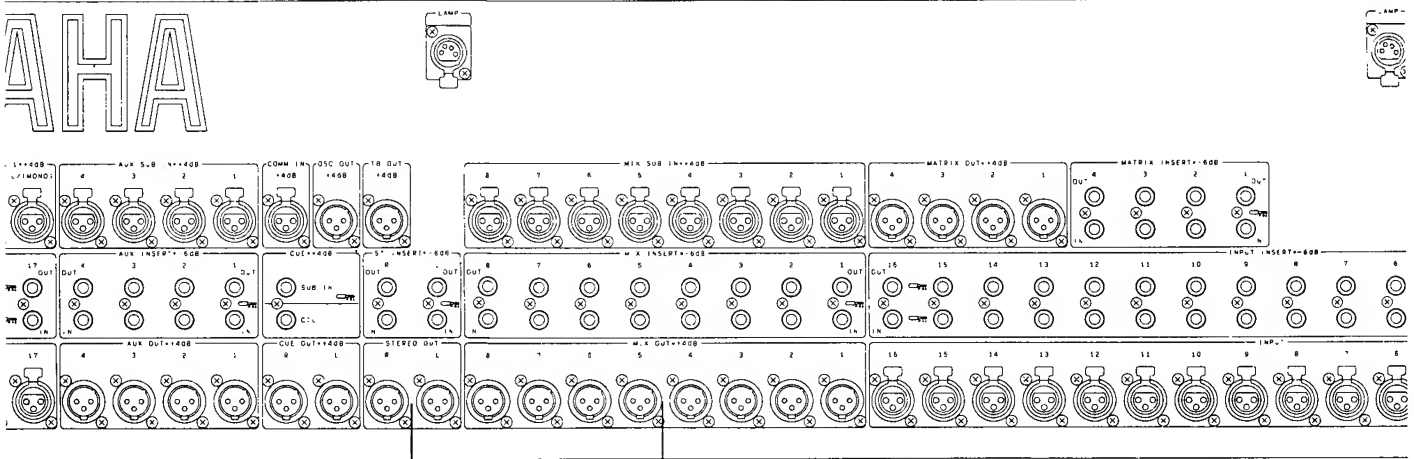


**104. STEREO OUT (L, R)**

This pair of male XLB connectors output the stereo mix after the STEREO MASTER fader [56]. They may be used to feed stereo monitor system, master tape recorder, house mixing console or other remote system.

**105. MIX OUT (1 - 8)**

These eight male XLB connectors output signal from the eight primary mixing busses, just after the Mix Master Faders [35]. They may be used to control the overall level of the outputs to various monitors.



104

105

## 2.3 The PW2800 Power Supply

### 106. POWER (On/Off)

This locking switch turns on the AC power to the supply, and thereby provides the necessary voltages to the console via the umbilical power cables. An adjacent LED is on when power is on.

### 107. (Grille)

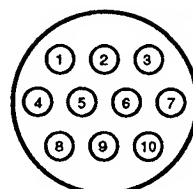
The power supply is cooled by a quiet running fan that pulls air through this front-panel grille and exhausts it through vents along the edge of the top and side panels. A reticulated foam element behind the grille filters the air entering the power supply.

**NOTE:** The filter element is cleanable. Refer to Section 9.

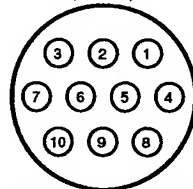
### 108. (Umbilical Connector)

This locking, multi-pin connector provides the necessary DC voltages from the PW2800 power supply to the PM2800M console. The cable must be connected before attempting to operate the console.

**CAUTION:** Always make certain that the PW2800 power is turned OFF prior to connecting or disconnecting the umbilical cable at the console or at the power supply.



CONSOLE SIDE  
(MALE)



POWER SUPPLY SIDE  
(FEMALE)

PIN N°	FUNCTION
1	E (+48 V)
2	E (+12 V)
3	E (±17 V)
4	+48 V
5	+12 V
6	+17 V
7	-17 V
8	GND
9	DETECT A
10	DETECT B

**Figure 2-9. PW2800 Umbilical Connector Pin Assignments**

*Note: The PW2800 and PW1800 power supplies have the same connector pin assignments. The PW2800 may be used in place of a PW1800 power supply in order to power a Yamaha PM1800 console. However, the PW1800 power supply does not have adequate current capability to drive a PM2800 console. Thus, if you have both consoles and wish to stock a spare power supply, stock a spare PW2800.*

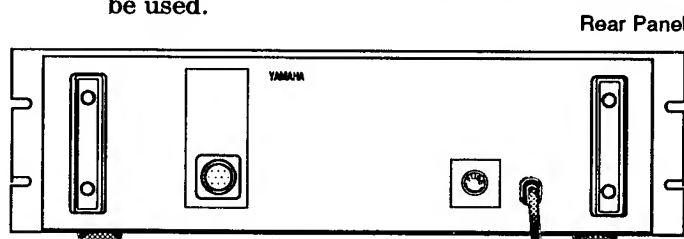
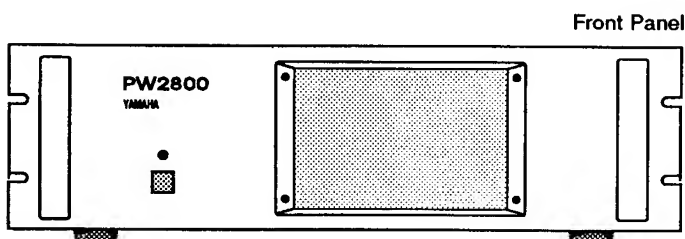
### 109. FUSES

Fuses protect the primary and secondary portions of the PW2800 power supply. They should be replaced only with fuses of the same current rating and type. The primary fuse is accessible on the rear panel, and is a 7A, 125V Slo-Blow type fuse. The internal secondary fuses normally will not blow, but are as follows:

+17 VDC Supply	6 A Slo-Blow
-17 VDC Supply	6 A Slo-Blow
+12 VDC Supply	10 A Slo-Blow
+48 VDC Supply	2 A Slo-Blow

### 110. (Power Cord)

This power cable connects the PW2800 to the AC power mains. A grounded (3-wire) outlet of at least 15 amperes capacity should be used.



**Figure 2-10. PW2800 Power Supply**